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U.S. DEPARTMENT OF COMMERCE/ National Institute of Standards and Technology

Report of the  
73rd National Conference  
on  
Weights and Measures  
1988





Report of the

## 73rd National Conference on Weights and Measures 1988

*Sponsored by the National Bureau of Standards  
Attended by Officials from the Various  
States, Counties, and Cities, and  
Representatives from U.S. Government,  
Industry, and Consumer Organizations  
Grand Rapids, MI July 17-22, 1988*

Report Editors:

Albert D. Tholen  
Carroll S. Brickenkamp  
Ann H. Turner

NOTE: As of 23 August 1988, the National Bureau of Standards (NBS) became the National Institute of Standards and Technology (NIST) when President Reagan signed into law the Omnibus Trade and Competitiveness Act.

*United States Department of Commerce  
C. William Verity, Secretary*

*National Institute of Standards and Technology  
(formerly National Bureau of Standards)  
Ernest Ambler, Director*



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## ABSTRACT

The 73rd Annual Meeting of the National Conference on Weights and Measures was held at the Amway Grand Plaza Hotel in Grand Rapids, Michigan during the week of July 17 through 22, 1988. The theme of the meeting was the "State Standards Program - 150th Anniversary".

In his keynote address, Chairman Darrell Guensler of California paid tribute to the foresight of those who established the State Standards program in 1836. He also praised those who volunteered their time and talents for the National Conference on Weights and Measures during this past year. Chairman Guensler thanked the two task force groups that completed their work this past year - the Task Force on the Prevention of Fraud and the Task Force on Commodity Requirements.

A complete revision of the Liquid Measuring Device Code in NBS Handbook 44 was adopted. Policy and test procedures were adopted for accommodating moisture loss in pre-packaged meat and poultry products from Federally-inspected plants. Revised policy was adopted on cash discount/credit card sales from single-price-computing motor fuel dispensers.

Special meetings included those of the Task Force on Energy Allocation, Metrologists' Workshops, the Associate Membership Committee, the Retired Officials Committee, the Scale Manufacturers' Association, the Industry Committee on Packaging and Labeling, the state regional weights and measures associations, and National Association of State Departments of Agriculture Weights and Measures Division.

Reports by the standing and annual committees of the Conference comprise the major portion of this publication, along with the addresses delivered by Conference officials and other authorities from government and industry.

Key words: legal metrology; specifications and tolerances; training; type evaluation; uniform laws and regulations; and weights and measures.

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Note: Opinions expressed in non-NBS papers are those of the authors and not necessarily those of the National Bureau of Standards. Non-NBS speakers are solely responsible for the content and quality of their material.



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# PAST CHAIRMEN OF THE CONFERENCE

<u>CONFERENCE</u>	<u>YEAR</u>	<u>CHAIRMAN</u>
43rd	1958	J. P. McBride, MA
44th	1959	C. M. Fuller, CA
45th	1960	H. E. Crawford, FL
46th	1961	R. E. Meek, IN
47th	1962	Robert Williams, NY
48th	1963	C. H. Stender, SC
49th	1964	D. M. Turnbull, WA
50th	1965	V. D. Campbell, OH
51st	1966	J. F. True, KS
52nd	1967	J. E. Bowen, MA
53rd	1968	C. C. Morgan, IN
54th	1969	S. H. Christie, NJ
55th	1970	R. W. Searles, OH
56th	1971	M. Jennings, TN
57th	1972	E. H. Black, CA
58th	1973	George L. Johnson, KY
59th	1974	John H. Lewis, WA
60th	1975	Sydney D. Andrews, FL
61st	1976	Richard L. Thompson, MD
62nd	1977	Earl Prideaux, CO
63rd	1978	James F. Lyles, VA
64th	1979	Kendrick J. Simila, OR
65th	1980	Charles H. Vincent, TX
66th	1981	Edward H. Stadolnik, MA
67th	1982	Edward C. Heffron, MI
68th	1983	Charles H. Greene, NM
69th	1984	Sam F. Hindsman, AR
70th	1985	Ezio F. Delfino, CA
71st	1986	George E. Mattimoe, HI
72nd	1987	Frank Nagele, MI

## OFFICERS, OFFICIALS, AND COMMITTEES OF THE CONFERENCE

### OFFICERS OF THE CONFERENCE

July 17 to July 22, 1988

#### ELECTED

Chairman:	Darrell Guensler, California*
Chairman-Elect:	John Bartfai, New York*
Past Chairman:	Frank Nagele, Michigan*
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Executive Secretary:	Albert Tholen* Chief, Office of Weights & Measures

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Parliamentarian:	James Melgaard, South Dakota
Assistant Treasurer:	Gerald Hanson, San Bernardino County, CA

\*Ex-officio members of the Executive Committee

OIML Representatives: PS7/RS 5: Raymond Helmick, Arizona  
PS5D/RS 10: Kenneth Butcher, Maryland  
PS7/RS 8: John Elengo, Revere Corp.

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(Appointed)

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Technical Advisor: Carroll Brickenkamp, NBS

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James Truex, Ohio  
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Maxwell Gray, Florida  
Charles Greene, New Mexico  
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Richard Davis, James River Corporation  
John McCutcheon, U.S. Department of Agriculture,  
Food Safety and Inspection Service  
Kathleen Thuner, San Diego, CA  
Technical Advisor: Karl Newell, NBS



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(Appointed)

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James Rardin, West Virginia

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William Braun, Procter and Gamble Co.  
Don Stagg, Alabama  
Robert Walker, Indiana  
Albert Tholen, National Bureau of Standards

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Stuart Rosenthal, New York, NY  
James Vanderwielen, Tippecanoe County, IN

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Maxwell Gray, Florida  
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George MacDonald, Minnesota  
Sterling McFarlane, Seattle, WA  
Stephen McGuire, Illinois  
Stephen Meloy, Montana

\*Technical Advisor: Richard Smith, National Bureau of Standards

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Harvey Lodge, Dunbar Manufacturing  
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Paul Engler, California  
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Tom Klevey, Millers' National Federation  
John McCutcheon, U.S. Department of Agriculture  
Food Safety and Inspection Service  
Allan Nelson, Connecticut  
Howard Pippin, U.S. Food and Drug Administration  
Stephen Pretanik, National Boiler Council  
George Wilson, American Meat Institute

Carroll Brickenkamp, NBS Technical Advisor

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James Rardin, West Virginia  
Richard Shockley, Maryland  
David Wallace, Colorado

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Ken Hoberman, GRH Electronics  
Russ Lebo, Diebold, Inc.

Tina Gaver Butcher, NBS Technical Advisor

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John Lacy, U.S. Department of Agriculture, Packers and Stockyards  
Dennis Mahoney, U.S. Department of Agriculture, Federal Grain Inspection Service  
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John Robinson, Assoc. of American Railroads  
Thomas Stabler, Toledo Scale Co.  
Daryl Tonini, Scale Manufacturers Association

## BELT CONVEYOR SECTOR

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### PUBLIC MEMBERS

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Raymond Helmick, Arizona  
Henry Oppermann, National Bureau of Standards  
John Rabb, Alabama  
David Wallace, Colorado  
Otto Warnlof, National Bureau of Standards

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Darry Boyd, Industrial Weighing Consultant Corp.  
Gerald Burger, Consumers Power Co.  
Max Casanova, Ramsey Engineering  
Daniel Cockrell, Weighing and Control Systems, Inc.  
Richard Desollar, Central Illinois Public Service  
Shawne Gibson, ABC Scale  
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Mitchell Hescox, Thayer Scale  
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Ted Johnson, Sensortronics  
Gar Kachel, Riede Systems, Inc.  
Kenneth Knapp, Milltronics  
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John MacFarlane, Autoweigh Co.  
Nicholas Ortyle, III, Revere Corp.  
John Robinson, Association of American Railroads  
Daniel Skelton, Virginia Power  
William Thurman, Southern Company Services, Inc.  
Daryl Tonini, Scale Manufacturers Association  
C. Toombs, Stock Equipment Corporation

## STATE REPRESENTATIVES

The following designated State representatives were present and voted on reports presented by the Conference standing and annual committees:

STATE	REPRESENTATIVE	ALTERNATE
Alabama	Don E. Stagg	John B. Rabb
Alaska	Aves Thompson	None
American Samoa	Arthur L. Young	Tauivi Tuinei
Arizona	Raymond Helmick	Richard E. Wolfe
Arkansas	Sam Hindsman	None
California	Darrell Guensler	Barbara Bloch
Colorado	David Wallace	None
Connecticut	Allan Nelson	None
Delaware	Eugene Keeley	None
District of Columbia	None	None
Florida	Maxwell Gray	Jack Jeffries
Georgia	Martin Coile	Curtis Williams
Hawaii	George Mattimoe	None
Idaho	Glen Jex	None
Illinois	Sid Colbrook	Steve McGuire
Indiana	Robert Walker	William R. Sevier
Iowa	James O'Connor	Jerry Bane
Kansas	DeVerne Phillips	None
Kentucky	Victor Page	None
Louisiana	Melvin Lyons	None
Maine	Clayton Davis	Bernie Austin
Maryland	Lacy DeGrange	M. Richard Shockley
Massachusetts	Charles Carroll	None
Michigan	Edward Heffron	Frank Nagele
Minnesota	Edward Skluzacek	George MacDonald
Mississippi	William P. Eldridge	None
Missouri	Lester H. Barrows	Ron Hookers
Montana	Stephen H. Meloy	None
Nebraska	Steven Malone	Michael Diesley
Nevada	None	None
New Hampshire	Michael Grenier	None
New Jersey	Thomas W. Kelly	Carl Conrad, Jr.
New Mexico	Fred Gerk	Charles Greene
New York	John Bartfai	Ross Andersen
North Carolina	N. David Smith	L. F. Eason



North Dakota	Curtis Roberts	None
Ohio	James C. Truex	Bruce Litzenberg
Oklahoma	O. Ray Elliott	Charles Carter
Oregon	Kendrick Simila	George Shefcheck
Pennsylvania	Dean Ely	None
Puerto Rico	None	None
Rhode Island	Lynda Maurer	None
South Carolina	Carol Fulmer	None
South Dakota	James A. Melgaard	Leonard Bies
Tennessee	Robert Williams	None
Texas	Edwin J. Price	James H. Eskew
Utah	Robert Smoot	Edison Stephens
Vermont	Trafford Brink	None
Virginia	G. W. Diggs	J. C. Stewart
Virgin Islands	Sandra Croft	None
Washington	Sterline McFarlane	Ralph Jones
West Virginia	Stephen Casto	John Holt
Wisconsin	Donald J. Soberg	None
Wyoming	Victor Gerber	Jim Bigelow

# SCHEDULED EVENTS

	JULY 17 SUNDAY	JULY 18 MONDAY	JULY 19 TUESDAY
8 a.m.		ORIENTATION SESSION FOR MEMBERS	
9 a.m.			LIAISON COMMITTEE SESSION
10 a.m.		SPECIFICATION AND TOLERANCES COMMITTEE SESSION	
11 a.m.			EXECUTIVE COMMITTEE SESSION
Noon			
1 p.m.		LUNCH (OPEN)	AUDITING COMMITTEE
2 p.m.			GENERAL SESSION — CEREMONIAL — OPENING CEREMONY ADDRESSES HONOR AWARDS PRESENTATION 150TH ANNIVERSARY RECEPTION
3 p.m.		LAWS AND REGULATIONS COMMITTEE SESSION	
4 p.m.	AMERICAN PETROLEUM INSTITUTE		ASSOCIATE MEMBERSHIP COMMITTEE
5 p.m.	SCALE MANUFACTURER'S ASSOCIATION TECHNICAL COMMITTEE	EDUCATION COMMITTEE SESSION	
6 p.m.			
7 p.m.	CHAIRMAN'S RECEPTION	OPEN	OPEN
8 p.m.			
9 p.m.			

# 73rd ANNUAL MEETING

JULY 20 WEDNESDAY				JULY 21 THURSDAY		JULY 22 FRIDAY		
				<p><u>VOTING SESSION*</u> (CONTINUED)</p> <p>NOMINATING COMMITTEE LAWS &amp; REGULATIONS COMMITTEE LIAISON COMMITTEE RESOLUTIONS COMMITTEE AUDITING COMMITTEE TREASURER'S REPORT</p> <hr/> <p>CLOSING CEREMONY</p>		BREAKFAST MEETING EXECUTIVE COMMITTEE AND OFFICERS		8 a.m.
						STANDING COMMITTEES, SPECIAL COMMITTEES, AND TASK FORCES— PLANNING		9 a.m.
REGIONAL ASSOCIATION SESSIONS								10 a.m.
NORTHEAST	CENTRAL	SOUTHERN	WESTERN					11 a.m.
LUNCH (OPEN)		RESOLUTIONS COMMITTEE LUNCH		LUNCH (OPEN)				Noon
<p><u>VOTING SESSION*</u></p> <p>VOTING PROCEDURE EDUCATION COMMITTEE EXECUTIVE COMMITTEE SPECIFICATIONS AND TOLERANCES COMMITTEE</p>				NATIONAL ORGANIZATION OF RETIRED MEMBERS				1 p.m.
				METROLOGY WORKSHOP				2 p.m.
				STANDING COMMITTEES WRAP-UP				3 p.m.
						ABBREVIATIONS KEY: NASDA = National Association of State Departments of Agriculture		4 p.m.
								5 p.m.
								6 p.m.
								7 p.m.
ASSOCIATE MEMBERSHIP RECEPTION				CONFERENCE OUTING				8 p.m.
						*At the two voting sessions the Committee's reports will be voted in the order shown.		9 p.m.

AUDITING COMMITTEE	
CHAIRMAN:	F. Clem, OH (1)
MEMBERS:	G. Hanson, CA (3) J. Rardin, WV (2)

CREDENTIALS COMMITTEE	
CHAIRMAN:	E. Keeley, DE (1)
MEMBERS:	S. Rosenthal, NY (3) J. Vanderwielen, IN (2)

EXECUTIVE NTEP BOARD	
ELECTED OFFICERS	
CHAIRMAN <sup>a</sup> :	D. Guensler, CA
CHAIRMAN-ELECT <sup>b</sup> :	J. Barfai, NY
PAST-CHAIRMAN <sup>b</sup> :	F. Nagele, MI
TREASURER <sup>b</sup> :	C. Gardner, NY
ONE YEAR	F. Gerk, NM J. Melgaard, SD
TWO YEAR	L. Dragheris, MA P. Nichols, CA
THREE YEAR	S. Hindsman, AR D. Slagg, AL

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OTHER ELECTED OFFICERS	
VICE-CHAIRMEN:	S. McFarlane, WA S. Rosenthal, NY Carol Fulmer, SC J. Vanderwielen, IN

COORDINATORS	
REGIONAL COORDINATOR:	R. Smith, NBS
CONFERENCE COORDINATOR:	A. Turner, NBS

OIML REPRESENTATIVES	
PS 7/RS 5:	R. Helmick, AZ
PS 5D/RS 10:	K. Butcher, MD
PS 7/RS 8:	J. Elengo, Rereve Corp.

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SPECIFICATIONS & TOLERANCES COMMITTEE	
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MEMBERS:	R. Andersen, NY (2) R. Helmick, AZ (5) J. Truex, OH (4) D. Watson, TX (3)
TECH ADVISOR:	H. Oppermann, NBS

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MEMBERS:	B. Bloch, CA (1) S. Colbrook, IL (3) A. Nelson, CT (5) N. David Smith, NC (4)
TECH ADVISOR:	C. Brickenkamp, NBS

LIAISON COMMITTEE	
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MEMBERS:	J. Akey, KS (3) R. Davis, James River Corp. (5) J. McCutcheon, USDA (2) K. Thuner, CA (4)
TECH ADVISOR:	K. Newell, NBS

WEIGHTS AND MEASURES WEEK SUBCOMMITTEE	
CHAIRMAN:	P. Adams, PA

LEGEND:

n - NON-VOTING MEMBERS  
e - EX-OFFICIO MEMBERS

NUMBERS IN PARENTHESES REFER TO YEARS  
REMAINING TO SERVE ON COMMITTEES

OIML - INTERNATIONAL ORGANIZATION OF  
LEGAL METROLOGY

REVISED - JULY, 1988

### SPECIAL COMMITTEES AND TASK FORCES

PRESIDENT<sup>n.e.</sup>: E. Ambler, NBS  
EXECUTIVE SECRETARY<sup>n.e.</sup>: A. Tholen, NBS

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PARLIAMENTARIAN: J. Meigaard, SD  
ASSISTANT TREASURER: G. Hanson, CA  
SERGEANTS-AT-ARMS: R. Jordan, MI  
R. Reedy, MI

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MEMBERS: G. W. Diggs, VA (3)\*  
M. Gray, FL (5)  
C. Greene, NM (2)  
S. Malone, NE (4)  
T. Scott, NC (3)\*

TECH ADVISOR: J. Koenig, NBS

\* G. W. Diggs completing T. Scott's term

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**MEMBERS:** E. Bratle, NCR Corp.  
J. Giannina, Grain Elevator and  
Processing Society  
W. Goodpaster, Cardinal Scale Co.  
R. Hurley, Fairbanks  
F. Katerheinhn, Hobart Corp.  
P. Katz, Hottinger Baldwin Measurements  
H. Lockery, Lockery Assoc.  
R. Meehan, Howe Richardson  
P. Penno, Transducers, Inc.  
J. Robinson, Assoc. of American Railroads  
T. Stieber, Toledo Scale Co.  
D. Tonini, Scale Manufacturers Association

CHAIRMAN: K. Appell, Colgate Palmolive  
VICE-CHAIRMAN: R. Davis, James River Corp.  
TREASURER: W. Braun, Procter & Gamble  
MEMBERS: M. Casanova, Ramsey Engineering  
A. Ladd, A.J. Ladd Weighing  
& Packaging  
H. Lodge, Dunbar Manufacturing  
J. Thompson, Kraft, Inc.  
T. Topalis, The Quaker Oats Co.  
R. Wel's, Sensitive Measurements, Inc.

**CHAIRMAN:** Pat Nichols, CA

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- P. Adams, PA
- D. Hamilton, OH
- J. Rardin, WV
- R. Shockley, MD
- D. Wallace, CO

**PRIVATE SECTOR:**

- J. Boggs, Borg Warner Chemicals
- K. Hoberman, GRH Electronics
- R. Lebo, Diebold, NBS

**TECH ADVISOR:** T. Butcher, NBS

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**MEMBERS:** M. Belue, Southwest Pump  
E. Brattle, NCR Corp.  
A. Evans, Veeder-Root  
R. Fonger, Bennett Pump  
W. Gerdom, Tokheim Corp.  
M. Hankel, Liquid Controls  
W. Key, Tokheim Corp.  
L. Murray, Dresser Industries, Inc.  
V. Rasheed, Service Station Dealers  
of America  
D. Smith, William A. Wilson's Sons

CHAIRMAN:	R. Thompson, MD
MEMBERS:	P. Adams, PA R. Bruci, Canada K. Butcher, MD P. Engler, CA E. Helfron, MI T. Klevay, Millers National Federation J. McCutcheon, USDA A. Nelson, CT H. Pippin, FDA S. Pretank, National Broiler Council G. Wilson, American Meat Institute
TECH ADVISOR:	C. Brickenkamp, NBS

CHAIRMAN: S. Malone, NE  
MEMBERS: R. Andersen, NY  
P. Perino, Transducers, Inc.  
K. Thuner, CA  
R. Tucker, Tokheim Corp.  
R. Whipple, Gilbarco, Inc.  
TECH ADVISOR: J. Koenig, NBS

## PUBLIC MEMBERS

- J. Berger, Technical Industries, Inc.
- D. Boyd, Industrial Weighing Consultant Corp.
- B. Burger, Consumers Power Company
- M. Casanova, Ramsey Engineering
- D. Cockrell, Weighing and Control Systems, Inc.
- R. Desolar, Central Illinois Public Service
- S. Gibson, ABC Scale
- M. Gruber, Industrial Weighing Corporation
- M. Hescox, Thayer Scale
- N. Johnson, Merrick Corp.
- T. Johnson, Sensortronics
- G. Kachel, Rhode Systems, Inc.
- F. K. Lloyd, CISTRONICS
- J. Napp, CSX Transportation
- J. H. Neeley, Auro Weight Company
- N. Oryle, III, Ravenna Corp.
- J. Robinson, Assoc. of American Railroads
- D. Skatton, Virginia Power
- W. Thurman, Southern Company Services, Inc.
- D. Tonini, Scale Manufacturers Association
- C. Toombs, Stock Equipment Corporation





**GENERAL SESSION**



## WELCOMING ADDRESS

DR. BURTON D. CARDWELL

Chief Deputy Director, Michigan Department of Agriculture

Welcome to the State of Michigan and to the 73rd annual conference of the National Conference on Weights and Measures. We hope many of you took the opportunity to come early or to stay after the conference to enjoy our beautiful state, meet its friendly people, experience its heritage and wander in its splendid scenery. I especially wish to welcome you, Dr. Ambler, to our state - it is a notable occasion!

Many of you have received a package of information, mailed earlier, which identifies specific locations and activities to visit. Michigan is an old territory, having been settled by French traders shortly after the pilgrims landed at Plymouth Rock. This meeting is being held, of course, in western Michigan, which enjoys the long continuous sandy beaches of Lake Michigan and lake-modified climates that have fostered extensive fruit and vegetable growing areas.

Michigan leads the Nation in production of bedding plants. You'll see parts of the hundreds of acres of greenhouses as you go to Holland later this week. As you may know, Michigan ranks among the top three states in the nation in the production of sweet cherries, tart cherries, dried beans, wine, cucumbers, blueberries, and apples. In fact, Michigan produces over 75% of the total tart cherries in the United States. I hope you take the opportunity to taste dried cherries, cherry sausage, and of course, traditional cherry pie while you are here.

Michigan has long been heavily involved in international trade. Its high technology aligns itself with metric measurements because of its technical, engineering and economic relationships with foreign countries. Similarly, our agriculture, because of its access to the Great Lakes for shipping to points around the world, has become very international. The Michigan Department of Agriculture maintains marketing offices in Africa, Europe, Hong Kong, and is now locating an office in the Caribbean. We have been blessed with a variety of food commodities, second only to California, and continually seek out others that have a need for these products. As you can imagine, recognized standards are a must!

Michigan joins with the National Conference in celebrating a 150th anniversary. For the Conference, it has been 150 years since our Federal government began issuing state standards to the states, including Michigan. For Michigan, it has been 150 years of statehood; allowing us in 1838 to be one of the newest states to have received these new state standards. At that time, Michigan's population numbered approximately 200,000 with 9,000 classified as city dwellers. Today, Michigan's population is 9.2 million and ranks 8th in population among all the states, with approximately 200,000 people living on farms and agriculture being Michigan's second leading industry; contributing nearly 15 1/2 billion dollars to our economy.

Automotive manufacturing leads our state in value of product, with agriculture as the second leading industry, followed closely by tourism. This leads me to acknowledge the importance to Michigan of the National Conference on Weights and Measures. Michigan is very conscious of the need of uniformity of laws, regulations, specifications, and tolerances in regulation; especially those developed through open hearings with high quality input.

We have embraced warmly the concept of the National Bureau of Standards as the sponsor of the National Conference on Weights and Measures, and as provider of the necessary coordination and collaboration so states in their own programs could assure equity in the marketplace.

We are very conscious and appreciative of the Conference's deliberations and decisions, and especially point out the accomplishments of the Task Force on Commodity Requirements, as well as the Task Force on Fraud. The Conference has approached, studied, and presented what I believe to be logical, pragmatic conclusions in a timely fashion.

Although I've never attended a conference before, I feel that I know you as an audience because of the years that Ed Heffron and Frank Nagele have discussed the activities of the National Conference. I share the high esteem that they have for the members of the Conference and the system itself. I believe we are in good hands when we rely on and utilize so many decisions coming from the Conference.

We have been very pleased with the training module program as developed and sponsored by the Conference. This should certainly serve as a model for many other training programs. This program proves the Federal government and states can have efficient, effective, and budget conscious, collaborative programs.

The Michigan Department of Agriculture joins the State of Michigan in welcoming you to our state. Many of the field staff of the weights and measures' state programs are able to be present during this session. I believe we have approximately 80 registrants, and at this time I ask them to stand and be acknowledged. These persons are also members of the Michigan State Association of Weights and Measures Officials, and are the key to our regulatory and service activities for the State of Michigan. We are proud of our employees, and believe they fit well in the total professionalism of this Conference. I want to assure you of Michigan's continued support of the Conference and the goals for which it aims.

Again, enjoy your time in Michigan.



## MEETING THE CHALLENGE

DR. ERNEST AMBLER  
Director, National Bureau of Standards

I am pleased to be with you again at this, our 73rd annual meeting. This year we are celebrating a very important occasion -- the 150th anniversary of the delivery of the first standards to the states. This was the result of Resolution No. 7 of the 24th Congress in 1836, which directed the Secretary of the Treasury to make and deliver a "complete set of all the weights and measures adopted as standards to the governor of each state in the union."

One-hundred and fifty years ago, the Congress recognized the important and unique roles to be played by the Office of Weights and Measures and the states in commerce. Today, even though there is a much larger and more active Federal Government, the states and local governments retain their extremely important functions such as education, law enforcement, much health and safety regulation, and, of course, weights and measurements regulation. Indeed, the states' responsibilities are strongly emphasized today as the general populace expresses disapproval of big Federal government.

I'd like to single out one aspect of the states' role that has involved National Bureau of Standards extensively: and that is the increasing role of the states and local governments in economic growth and development. In most states, and in many cities, there is tremendous enthusiasm and activism to boost technological competence and to become attractive locations for forward-looking companies.

There are today more than 500 state and local programs to support technology or technology development in 45 states that are spending close to a billion dollars on programs aimed at improving economic expansion in one way or another. It will be exciting to see if state and local governments, which are close to their local industries and workforce and which identify with their aims and objectives, can be effective in these experiments to stimulate economic growth and development.

Why are the governors and the state legislators and the citizens getting more involved in economic growth and development issues? The reason is very clear: the trade deficit, our declining competitiveness in global markets, and our need to improve productivity and quality concern all of us. Our competitiveness as a nation determines whether we will be able to create the wealth that allows us to pay wages and collect the revenues that enable us to maintain and improve our quality of life -- as individuals and as a nation.

For me, a straightforward measure of the importance of competitiveness is the U.S. balance in international trade. Although the trend is now upward, we still experienced a deficit of approximately 160 billion dollars last year; the last time U.S. merchandise trade was in balance was 1976.

Today, in 1988, there is much discussion at the national level about limitations on the effectiveness of our economy; limitations related to the quality of our products, our productivity, and our commitment to compete in the world. What we do individually and together can affect these broader issues we face as a nation. Indeed the resolution of these issues demands that we work together more than we have in the past.

I want to share some observations with you about some of these issues and the barriers facing U.S. industry and commerce. Then, I have some suggestions as to how we, NBS and the Conference, can contribute to the health of commerce.

### BARRIERS TO COMPETITIVENESS

While there should be no complacency, scientific research, technical ideas, and inventiveness are not the major problems for the United States when it comes to competing. Our greatest concern today is in applying the results of R&D to benefit our economy. Many of the most serious barriers to putting our vast technological resources to work in the marketplace are largely non-technical in nature. These so-called "macro-economic" barriers include capital formation, tax policy, the regulatory environment, trade policies of other countries, and intellectual property law.

Other barriers, more micro-economic in nature, are equally important when it comes to emerging technologies. Moreover, these are barriers that we, as technical people, tend to understand better and, therefore, should discuss and attack more vigorously.

I am talking here about inadequate long-range planning and commitment; the failure to commit this year's earnings to assure future corporate success. For example,

- It is expected and accepted that U.S. firms link management incentives (salary and bonuses) to short-range financial statements rather than to long-term company health and market share.
- In the United States, we have been focusing on mergers, leveraged buy-outs, and hostile takeovers, all of which divert resources and energy from managing successful businesses. In these cases, it seems as though we are developing a new tradition of rearranging wealth in place instead of the "go west young man" or "build a better mousetrap" tradition of creating new wealth. We must impress the financial markets that we want our money, our hard-earned lifetime savings, invested for the long steady pull.
- In our manufacturing operations, we focus too much on product technology and do not pay enough attention to process technology. We have largely been devoting our energies to improving specific products, rather than to improving the process by which products are made.
- The time to move from research to marketing is too long in the United States, putting us at a disadvantage with respect to countries like Japan which have shown the desire and ability to move much faster.

- We pay inadequate attention to the need to "design in" both quality and the ability to manufacture efficiently.
- Marketing, manufacture and design are no longer separate functions.

These examples highlight our deep recognition of the importance of quality and our constant pursuit of improvement in quality. That is why Congress and the Administration together created the Malcolm Baldrige National Quality Award. The purposes of the Malcolm Baldrige National Quality Award are threefold:

- to promote quality awareness in the U.S.,
- to recognize quality achievement, and
- to publicize successful quality strategies.

Congress has made it clear that quality achievement means total quality management. Companies that win awards may publicize and advertise -- surely a strong incentive to participate in the program. As for the number of awards, there may be up to two awards in each of three categories: manufacturing, service, and small business.

Those who will judge the applications have been instructed to keep in mind that the applicants will be given awards only if their level of overall excellence is at the level of a national model. It will be an extremely prestigious award. I am delighted that NBS has been given a key role in this program: I believe that NBS is the right organization for the government-industry cooperation that is needed at this time.

#### WHAT CAN NBS AND NCWM CONTRIBUTE?

What do NBS and the Conference have to contribute to the resolution of the barriers to competitiveness I mentioned earlier? The common thread that runs through many of these issues is measurement. Measurement does not sound thrilling. But measurement truly is important, and everyone makes measurements, whether they know it or not. That goes for scientists and engineers in industry, university and government -- state and local as well as the Federal government. It goes for medicine, it goes for the environment and weather, and it goes for the general public. And it certainly goes for weights and measures.

So, in answer to the question "how can each of you here help the U.S. regain the competitive edge?", let me say that one sure way is to pay more and closer attention to measurement; it will make a difference. To play closer attention, I urge you to heed the actions and programs of this Conference, such as the National Training Program, Handbook 44, and the National Type Evaluation Program. Pay closer attention to adopting and using these resources in your regulatory programs.

I believe that NBS has a proven track record of helping industry in general, and weights and measures in particular, to improve and to prosper; I am certain that we can and will be doing even more. Certainly, the NBS can and should provide support:

- through research and development,

-- through fair and decisive actions

- o to provide the basis for a healthy weights and measures environment,
- o to help the states turn the latest developments in measurement technology into regulatory successes, and
- o to assist U.S. scale manufacturers in their efforts to win international market share and thereby to reduce that horrible trade deficit.

I believe that NBS and this Conference have made impressive progress in the past ten years, particularly through the National Type Evaluation Program. However, matching the joint NBS/NCWM achievements to the needs and resources of companies and individual states is a job that simply cannot be done in Washington only. The states and the local governments must do more to apply the NCWM actions developed and adopted for their programs.

In short, there is no substitute for your actions. In particular, you may need to break with tradition and aggressively adopt change. Not change for change's sake, but change that will allow the United States to move its new technologies into the marketplace faster. For example, your state officials and inspectors must become fully and uniformly qualified to apply the most recent Handbook 44 requirements. The new technology incorporated in devices cannot be handled with traditional skills.

Plan to train your staffs. Use the Conference modules as they are intended. Request the necessary budget to do the training right. The better qualified your staff, the better your program will be. State Directors: don't cut corners. If you train an inspector partially, he will do only a partial job.

The integrity of commerce depends on the quality of devices used in commerce. The Conference has recognized this reality by modernizing Handbook 44. The modern codes in Handbook 44 must be understood and applied in every state. However, application of some of the new requirements require facilities and skills that many states do not have and cannot afford. The Conference recognized this and established the National Type Evaluation Program. It is imperative that every state adopt the Uniform Regulation for National Type Evaluation; the NTEP Certificate of Conformance must become a requirement for every type of device used in commerce in every state.

We are a highly pluralistic nation, searching for ways to act together that fit our own political beliefs. But in self-interest we must act with national unity. The new world of international trade is a difficult one for a nation of people that is accustomed to organizing into new special interest groups at the drop of a hat, of people brought up as competing rugged individualists, of people who idolize the cowboy rather than the covered wagon sodbusting pioneers. It will take all of our collective energy and intelligence to compete against more organized nations who target our markets.

That is why I become excited when I see the initiatives the National Conference has demonstrated. You are out in front at these meetings. The forward-looking, tradition-breaking attitudes shown in the Conference must be taken home with you.

## CONCLUSION

I congratulate those of you who have gone back to your states after the annual meetings and have adopted the changes voted for by the Conference. A few states do this routinely.

The work of this progressive body must be translated into active program changes in every state. I singled out two areas for action now, the National Training Program and NTEP. There are others.

The future of commerce is truly in your hands. I look forward to a continued alliance with you, seeing your state weights and measures programs keep pace with the actions of the Conference as they translate measurement technology into program changes.

You can assist by breaking from traditions that inhibit progress, in order to introduce new technologies into the marketplace. You can do a great deal to advance commerce in your state. You can be a model.

You have that responsibility, and you will live up to it, because you are one of the most patriotic and caring organizations I know.

Become the bright examples of progressive and effective state operations. Help keep our commerce healthy and our businesses number one in the world.

Thank you.



## NCWM CHAIRMAN'S ADDRESS

DARRELL GUENSLER  
Chief, Division of Measurement Standards  
State of California

Mr. President, honored guests, fellow members:

Around 2500 BC the Pharaoh decreed that Egyptians would use the cylindrical royal cubit stone as a standard unit of measure. COMMERCIAL PROGRESS DEMANDED IT.

Over 4000 years later, most of us don't know what a cubit stone is anymore. Standards, however, are still necessary. Why?--BECAUSE COMMERCIAL PROGRESS DEMANDS IT.

While the need for standards hasn't changed, the commercial marketplace has changed dramatically. One hundred and fifty years ago, when the celebrated standards were being delivered to the States, there were no automobiles on the roads; electronics were unheard of; flying was only a dream and going into space was considered by most to be impossible.

People didn't need gasoline quality standards; they didn't worry about cash/credit sales; they didn't care about testing load cells for temperature effects; they didn't even think about determining moisture loss in poultry. Sounds like they had it easy, doesn't it? I doubt it. What they had was foresight.

We should thank our predecessors who set up this system; who supported the States' programs 150 years ago by supplying standards; who created this Conference so that we could respond to this changing environment as necessary, without the need for complete Federal preemption. We have a system that works; one in which we can be proud to be involved.

When you registered for this Conference, you were presented with a beautiful parchment copy of the 1836 Congressional resolution which started the States' Standards Program. I hope that you will be equally proud of this memento and will display it accordingly.

It has been an honor and a great pleasure to serve as your Chairman over the past year. Our accomplishments are a result of the hard work of many devoted people. As your Chairman, I was called upon to make many appointments to committees and task forces, and to ask many people for their help in accomplishing a particular task or goal. I think it is notable that, in every case, when I asked individuals to serve, each one responded enthusiastically in the affirmative. No one had to be begged, badgered or bribed. I think that speaks well for the members of this Conference.

Part of my responsibilities were to represent you at meetings of several organizations. These included the Western Weights and Measures Association, the Southern Weights and Measures Association, the Central Weights and Measures Association, the Northeast Weights and Measures Association, and the Scale Manufacturers Association. This was a valuable experience for me. I left each of those meetings with a renewed respect for the organizations and for the people involved in them.



The past year also produced a variety of emotional experiences for us. Our spirits were buoyed by the weddings of Ann Heffernan to Bob Turner and of Tina Gaver to Ken Butcher and by the birth of little Adam to Ross and Carole Anderson. We were saddened by the passing of our good friend Dick Thompson and the retirement due to ill health of Tom Scott. Finally, we experienced mixed emotions by the retirement of Jim Lyles, Paul Engler and Don Lynch who are now living the "life of Riley."

One of our primary efforts this year has been to complete some of the work that was already before the Conference. I think we have been successful in this effort. The Task Force on Commodity Requirements has presented its final recommendations for our consideration at this Conference, as has the Task Force on Prevention of Fraud. We have completed our transition into the New Scales Code for the most part. There is still some work to do in this area and probably always will be. We have made progress in training trainers so that the regional associations and individual states will be better equipped to cope with their training needs.

In the area of new activities, we have begun a study of Energy Allocation Systems in an attempt to determine just what our responsibility should be. We have also begun work on the development of type evaluation criteria for belt conveyor scales. Additionally, as you are aware, the Conference is coming to grips with the cash/credit problems for gasoline sales.

With all this activity we must still keep in mind that it is our responsibility to successfully guide our respective programs into the 21st century. We have significant budget challenges to face in our effort to compete for resources with the many politically popular health and welfare programs currently funded with tax dollars. We must also somehow keep up with the rapidly expanding technology which impacts on our programs. We must recognize the need to work toward sensible uniformity in order to eliminate unnecessary trade barriers both nationally and internationally. We must learn to cope with Federal preemption issues which relate to weights and measures. The challenges are there. The question is, can we respond? I think we can.

Later this afternoon we will be recognizing members of this Conference who have served in various responsibilities. There is one group of people who, in my opinion, do not get the recognition that they deserve. Without these dedicated people, the Conference would be hard pressed to accomplish what it does. I know that I could not have done without their help and support this year.

Therefore, I'd like to offer a special thanks from me to each of you. To:

CARROLL BRICKENKAMP, who came to my rescue several times this year, including dropping everything to rush out to California when we had a critical problem on the moisture loss issue. Where would the L&R Committee be without her? Thank you, Carroll.

HENRY OPPERMAN, who is probably the hardest working person I know and invaluable to this Conference. The S&T Committee and NTEP really depend on this guy. Thank you, Henry.

JOAN KOENIG, who kept me busy signing my name to what seemed like hundreds of training documents, and who does an excellent job with the Education Committee. Thank you, Joan.

KARL NEWELL, who kept the bulletin board lines open even though my modem seemed to be continually broken down, and who guides the Liaison Committee through its difficult issues. Thank you, Karl.

DICK SMITH, who kept me on the right track at the regional meetings, and supports us all through his training. Thank you, Dick.

TINA GAVER BUTCHER, the newest member of OWM's staff, who literally landed on the job in a running position and hasn't stopped yet except to get married. I really appreciate the way Tina took hold of the Energy Allocation Task Force responsibilities. Thank you, Tina.

KAREN BARKLEY & TERRY GRIMES, who always seem to be working. Karen has gone on to bigger and better things, but I want to thank her as well as Terry for all their help. Thank you both.

ANN HEFFERNAN TURNER, last but certainly not least. The person who puts this whole thing together. She's the greatest. Thank you, Ann.

Of course there is one guy who is in the enviable position of getting credit for the accomplishments of these fine people. He is the person that I turned to all year for guidance, AL THOLEN. Thank you, Al.

There is one other person who is no longer with the Office of Weights and Measures but still guides us in our interaction with OIML. That person is Otto Warnlof. Otto has served this Conference well for many years and has been a great help to me. Thank you, my friend.

Thank you all.

### HONOR AWARDS PRESENTATIONS

Dr. Ernest Ambler, President of the Conference, presented Honor Awards to members of the Conference who, by attending the 73rd Annual Meeting this year, reach one of the attendance categories for which recognition is made - attendance at 10, 15, 20, 25, and 30 years.

#### 10 YEARS

Ernest Ambler, National Bureau of Standards  
Richard Hurley, Fairbanks Scales  
Albert Mysogland, Lake County, IN  
Thomas Pragar, City of Cincinnati, OH  
N. David Smith, State of North Carolina  
David Watson, City of Fort Worth, TX  
Donald J. Weick, City of Topeka, KS  
Robert C. Williams, State of Tennessee

#### 15 YEARS

Carroll S. Brickenkamp, National Bureau of Standards  
Louis D. Draghetti, Town of Agawam, MA  
Sam F. Hindsman, State of Arkansas  
John B. Rabb, State of Alabama  
George W. Staffeldt, City of Mishawaka, IN  
Guy Tommasi, Town of Middletown, CT

#### 20 YEARS

Richard Claussen, Porter County, IN  
George E. Mattimoe, State of Hawaii

#### 25 YEARS

William Sevier, Gibson County, IN  
Raymond Helmick, State of Arizona

### CERTIFICATES OF APPRECIATION

Darrell Guensler, Conference Chairman, presented Certificates of Appreciation to members of standing committees and task forces who had completed their tenure on the committees and task forces.

Auditing Committee	Fred Clem, Columbus, OH
Credentials Committee	Eugene Keeley, Delaware
Resolutions Committee	Charles Carroll, Massachusetts George MacDonald, Minnesota
Nominating Committee	Donald Lynch, Kansas City, KS
Budget Review Committee	Robert Walker, Indiana

## General Session

Executive Committee	Fred Gerke, New Mexico James Lyles, Virginia
Specifications & Tolerances Committee	Kenneth Butcher, Maryland
Liaison Committee	Peggy Adams, Bucks County, PA
Education, Administration, and Consumer Affairs	Thomas Geiler, Barnstable, MA Thomas Scott, North Carolina
Associate Membership Committee	Kenneth Appell, Colgate Palmolive Co.
Vice Chairman	Sterling McFarlane, Seattle, WA Stuart Rosenthal, New York, NY Carol Fulmer, South Carolina James Vanderwielen, Tippecanoe County, IN
Sergeant-at-Arms	Rodney Jordan, Michigan Ronald Reedy, Michigan

### TASK FORCE ON COMMODITY REQUIREMENTS

Richard Thompson, State of Maryland, Chairman  
Peggy Adams, Bucks County, PA  
Robert Bruce, Canada  
Kenneth Butcher, State of Maryland  
Paul Engler, State of California  
Edward Heffron, State of Michigan  
Tom Klevay, Millers' National Federation  
John McCutcheon, U.S. Department of Agriculture,  
Food Safety and Inspection Service  
Allan Nelson, State of Connecticut  
Howard Pippin, Food and Drug Administration  
Stephen Pretanik, National Broiler Council  
George Wilson, American Meat Institute

### TASK FORCE ON PREVENTION OF FRAUD

Steven Malone, State of Nebraska, Chairman  
Ross Andersen, State of New York  
Peter Perino, Transducers, Inc.  
Kathleen Thuner, San Diego County, CA  
Richard Tucker, Tokheim Corporation  
Richard Whipple, Gilbarco, Inc.

**PRESIDENT'S AWARD**

This award is a banner presented to the State Director of each state having 100% of its weights and measures officials as members of the National Conference on Weights and Measures.

First Year Awards

**BANNERS**

District of Columbia  
Vermont  
Virginia

Streamers for Second Year 100% Membership

Alaska  
Delaware  
Idaho  
Kansas  
South Dakota

Streamers for Third Year 100% Membership

Arkansas  
Nebraska



**STANDING COMMITTEE REPORTS**





## REPORT OF THE EXECUTIVE COMMITTEE

Darrell A. Guensler, Chairman  
Assistant Director, Division of Measurement Standards  
State of California

### REFERENCE KEY NO.

100

### INTRODUCTION

This is the Final Report of the Executive Committee for the 73rd Annual Meeting of the National Conference on Weights and Measures. The Report is based on the Interim Report offered in the Conference "Program and Committee Reports" (NCWM Publication 16), the Addendum Sheets issued at the meeting, and actions taken by the membership at the meeting.

The Committee's Final Report is grouped into two parts: Part I - Executive Committee business; and Part II - National Type Evaluation Program, Board of Governors business.

The two parts are divided into the following series:

#### PART I

ADMINISTRATION AND POLICY	101 Series
OPERATIONS	102 Series
NCWM PROGRAMS	103 Series

#### PART II

NTEP ADMINISTRATION AND POLICY	111 Series
NTEP OPERATIONS	112 Series
NTEP PROGRAMS	113 Series

Table A identifies all of the items contained in the Report by Reference Key Number, Item Title, and Page Number; Table B lists the appendices to the Report; Table C reports the voting results.

The Reference Key Number and Item Title of voting items are identified in bold face type as well as by a suffix "V" (i.e., **103-2 V Task Force on Commodity Requirements**). Items marked with an "I" are informational.

**Table A**  
**REFERENCE KEY ITEMS AND INDEX**

Reference Key No.	Title of Item	Page
<b>PART I</b>		
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101-1 I	NBS Publications	41
101-2 I	NCWM Publications	41
101-3 I	Annual Work Schedule	42
101-4 I	Role of Metrologists at Annual Meeting	42
<b>OPERATIONS</b>		
102-1 I	Status Report, Membership	42
102-2 I	Treasurers Report	45
102-3 I	Operating Budget	45
102-4 I	Grant Budget	45
102-5 I	Appointments and Assignments	46
102-6 I	Annual Meeting, 73rd	48
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102-8 I	Annual Meeting, 75th	49
102-9 I	Annual Meeting, 76th	49
102-10 I	Annual Meetings, Other	49
<b>PROGRAMS</b>		
103-1 I	National Training Program	49
103-2 V	<b>Task Force on Commodity Requirements</b>	50
103-3 I	Task Force on Fraud	52
103-4 I	Task Force on Energy Allocation Systems	53
103-5 I	Issues Roundtable	53
103-6 V	<b>Program Update, OIML</b>	53
103-7 I	Program Update, OWM	55
<b>PART II</b>		
<b>NTEP ADMINISTRATION AND POLICY</b>		
111-1 I	NCWM Publication #14	55
111-2 I	Scales, Pre-NTEP Approved	59
111-3 I	System "Upgrade" Evaluation	59
111-4 I	Manufactured Devices, Conformance	59
111-5 I	Replacement Parts, Conformance	60
111-6 I	Repair or Remanufacture of Load Cells	61

**NTEP OPERATIONS**

Table A (continued)

Reference Key No.	Title of Item	Page
112-1 I	Acceptance by the States	61
112-2 I	Participating Laboratories	62
112-3 I	Status of Certificates of Conformance Issued and the Backlog	62
<b>NTEP PROGRAMS</b>		
113-1 I	Belt-Conveyor Scales, Test Procedures	64
113-2 I	Change in Performance Characteristics	64
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**APPENDICES**

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A.	Publications, Office of Weights and Measures and the National Conference on Weights and Measures	66
B.	NCWM Operating Budget 88/89	69
C.	Site Visit, Albany, New York	72
D.	Report to the Executive Committee of the Task Force on Commodity Requirements	74
E.	Report to the Executive Committee of the Task Force on Prevention of Fraud	97
F.	Task Force on Energy Allocation Systems	
G.	Program Update, Office of Weights and Measures	114 119
H.	Meeting Summary of the Technical Committee on National Type Evaluation - Weighing Industry Sector and of the Board of Governors	126
I.	Pre-NTEP Approval Recognition	142
J.	Scale Manufacturers Association Request	143

## ORDER OF PRESENTATION

The Report was presented to the membership for voting as follows:

1. Voting Items. A separate vote was taken on the two voting items:

103-2 V Task Force on Commodity Requirements  
103-6 V Program Update, OIML

2. Information Items for Ratification. A single vote was taken for ratification of information items reporting on policy decisions by the Board of Governors. The Board of Governors reports on policy changes to the Membership at the Annual Meeting as Information Items. The seven informational items, labelled as voting items in the Interim Report plus Item 111-1, which had been an informational item, offered for vote as a group, were:

111-1 I NCWM Publication #14  
111-2 I Scales, Pre-NTEP Approved  
111-3 I System "Upgrade" Evaluation  
111-4 I Manufactured Devices, Conformance  
111-5 I Replacement Parts, Conformance  
111-6 I Repair or Remanufacture of Load Cells  
113-2 I Change in Performance Characteristics  
113-3 I Multiple Load Cell Applications

3. A vote was taken on the entire Report with editorial privileges afforded to the Executive Secretary.

Table C  
VOTING RESULTS

Reference Key No. or Subject	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
103-2V	48	1	84	0	Passed
103-6V	49	0	84	0	Passed
Information Items	50	0	82	0	Passed
Report in its entirety	49	0	82	0	Passed

**DETAILS OF ALL ITEMS  
(in the order they appear in Table A)**

**PART I**

**NCWM ADMINISTRATION AND POLICY**

101-1	I	NBS PUBLICATIONS
101-2	I	NCWM PUBLICATIONS

Procurement from the Government Printing Office (GPO)

Two issues related to procurement of documents from the Government Printing Office were discussed:

- (1) the increased cost of GPO documents;
- (2) the long time taken by GPO to fill orders.

The Executive Secretary reported that GPO priced the 1988 editions of NBS Handbooks 44 and 130 the same as the 1987 editions. Various states reported that the response time of GPO has improved.

No further action will be taken to find alternatives to procurement from the Government Printing Office as long as GPO prices remain stable and its response time in filling orders is acceptable.

Sources of Documents

The Executive Secretary provided a list by source of weights and measures documents (Appendix A). The three primary sources are:

- (1) the Government Printing Office for current NBS publications;
- (2) the National Technical Information Service (NTIS) for NBS documents no longer available from the GPO; and
- (3) the National Conference on Weights and Measures for Conference publications.

It was noted that each member of the National Conference on Weights and Measures receives a copy of selected current NBS and NCWM documents (e.g., NBS Handbooks 44, 130, 133, and the Annual Proceedings of the NCWM).

Desktop Publishing

The Executive Secretary described the "Desktop Publishing" system recently acquired by OWM. This system will provide OWM with the capability to upgrade the appearance of weights and measures publications by the use of graphics, fonts, and styles. The system includes a laser printer with higher speed.

NCWM Mailing List and Directories

The Executive Secretary reported that the NCWM mailing list has been installed on the Conference computer. During the next few months, the Conference will continue to get mailing labels and listings from the contractor who has been doing this for several years; the same information will be produced using the NCWM computer to compare "in-house" results with the contractor-produced data. When the accuracy of the "in-house" data base is acceptable, the Conference will use the "in-house" capability exclusively.

## Executive Committee

The next editions of the NCWM directories will be produced using the contractor's files; the 1989 editions of the directories will use the "in-house" data base.

### 101-3 I ANNUAL WORK SCHEDULE

#### Interim Meeting Agenda Items, Submission Date

The Executive Secretary requested a change in policy to change the deadline for submitting agenda items for the Interim Meeting from Nov. 15 to Nov. 1. Since the Scale Manufacturers Association and the Southern Weights and Measures Association hold late fall meetings, they were contacted to determine if the change would pose any problems. Both agreed that the change would be acceptable.

Conclusion: November 1 will be the deadline date for submitting items for the Agenda of the Interim Meeting.

#### Annual and Interim Meetings, Dates for Meeting

The Committee discussed alternative dates for the Annual and Interim Meetings, including spring/fall rather than the current winter/summer scheduling. No compelling arguments were made for changing from the current format.

Conclusion: The current format of holding the Annual Meeting during the third week in July and the Interim Meeting during the second week in January will be continued.

### 101-4 I ROLE OF METROLOGISTS AT ANNUAL MEETING

Traditionally, the state metrologists have held two workshops at the Annual Meeting. In some cases, they have programmed a portion of their time to visit the local state laboratory or a public sector laboratory in the city hosting the meeting.

The metrologists offered recommendations to the Executive Committee that would strengthen the program of the metrologists and enable them to contribute more to the success of the Annual Meeting and to the state programs, including more capability to address technical issues in their field of metrology.

Conclusion: Arrangements were made at the Annual Meeting for the metrologists to meet and develop recommendations for increasing the effectiveness of their program. Their report will be reviewed by the Executive Committee at its January, 1989 Interim Meeting.

## NCWM OPERATIONS

### 102-1 I STATUS REPORT, MEMBERSHIP

The current status of NCWM membership, including trends in total membership and its composition, was reviewed. The membership of the NCWM has been between 1300 and 1400 in recent years. Of the 1326 members as of December 1987, 41% are active (weights and measures officials) and 54% are associate (industry) members. The rest are federal government, foreign representatives or retirees. Fewer than 21% of the weights and measures officials nationwide belong to the NCWM.

Table D shows the membership by state and Table E shows the composition of the NCWM mailing list by membership category.



**Table D**  
**NCWM MEMBERSHIP BY STATE**  
 (\* 87 data as of 12/1/87)

Jurisdiction	Members 86/87*	Jurisdiction	Members 86/87*
Alabama	16/14	Alaska	3/10
American Samoa	1/1	Arizona	8/6
Arkansas	21/40	California	96/97
Colorado	18/13	Connecticut	23/25
Delaware	7/8	District of Columbia	36/47
Florida	20/20	Georgia	21/25
Guam	1/0	Hawaii	3/3
Idaho	14/7	Illinois	56/54
Indiana	50/48	Iowa	10/8
Kansas	32/33	Kentucky	3/6
Louisiana	4/7	Maine	5/11
Maryland	39/41	Massachusetts	54/51
Michigan	22/23	Minnesota	30/28
Mississippi	7/6	Missouri	53/57
Montana	1/1	Nebraska	26/23
Nevada	1/2	New Hampshire	4/5
New Jersey	74/67	New Mexico	27/5
New York	72/71	North Carolina	25/21
North Dakota	2/2	Ohio	106/109
Oklahoma	19/17	Oregon	12/11
Pennsylvania	64/63	Puerto Rico	6/3
Rhode Island	2/4	South Carolina	4/7
South Dakota	13/11	Tennessee	11/13
Texas	46/41	Utah	4/4
Vermont	11/9	Virginia	33/65
Virgin Islands	1/2	Washington	19/15
West Virginia	9/6	Wisconsin	34/30
Wyoming	7/5		

The membership for the current year has increased. The President's Award seems to be producing results. Most of the states which had qualified for banners prior to this year have repeated and qualified for streamers. The states currently qualifying are listed in Table F.

State directors in other states are attempting to justify membership as a routine budget element by using it as an economic source of handbooks needed by the staff. OWM will provide the states with sample justification used for this purpose.

**Table E**  
**COMPOSITION OF NCWM MAILING LIST 86/87**

Category	NCWM Members	Non- Members	Total
State	241/271	862/903	1103/1174
County	158/162	672/727	830/889
City	126/115	436/398	562/513
Subtotal	525/548	1970/2028	2495/2576
Federal	31/27	18/21	49/48
Industry	749/717	2456/2372	3205/3089
Retirees	8/9	5/6	13/15
Subtotal	1313/1301	4449/4427	5762/5728
Foreign	/25	/137	/162
Total	1313/1326	4449/4564	5762/5890

**Table F**  
**PRESIDENTS AWARD WINNERS**

Banner		Streamers	
State	Year	2nd Year	3rd Year
Arkansas	1986	1987	1988
Kansas	1986	1987	1988
Alaska	1987	1988	
Delaware	1987	1988	
Idaho	1987	1988	
Kansas	1987	1988	
South Dakota	1987	1988	
District of Columbia	1988		
Vermont	1988		
Virginia	1988		

## 102-2 I TREASURER'S REPORT

At the Annual Meeting, the Treasurer reported on the financial status of the NCWM as of the close of the fiscal year (June 30, 1988). The cash balance at the end of the FY was \$20,000 greater than it was at the end of the prior FY; this was due to that increase in membership fee income. A certificate of deposit will be purchased after all expenses of the Annual Meeting have been paid and the amount of monies in excess of projected needs can be better estimated. See the Treasurer's Report for details.

## 102-3 I OPERATING BUDGET

Details of the draft operating budget for the fiscal year beginning July 1, 1988 were reviewed at the Annual Meeting. See Appendix B. The budget was approved by the Committee, with the following actions to be taken.

1. A proposed allocation of \$10,000 for use by the Committee on Education, Administration and Consumer Affairs for the development of training modules (Account 12.5) was discussed at length. The Executive Committee decided that Account 12.5 be changed from "Services, Contracts" to "Module Implementation Materials," and that the item be footnoted to limit its use for the development of materials for use in teaching instructor skills to state personnel conducting training using the training modules; the funds are not to be used for development of additional modules.
2. The Executive Secretary was requested to add a column to future draft operating budgets to show "actual" income and expenditures from the most recent year. This additional information will aid the members of the Executive Committee and the Budget Review Committee when reviewing the proposed budget.

## 102-4 I GRANT BUDGET

At the Interim Meeting, the Grant Budget was reviewed in the context of the total Grant funding since its beginning. Of the unobligated balance of funds (\$91,865.61), \$40,365.61 will be spent or obligated in the second half of the Budget Year 87/88; the balance of \$51,500.00 is budgeted for expenditure during the Budget Year 88/89 (Tables G and H).

The \$10,000 in Account 12.5 of the NCWM Operating Budget for development of materials for implementation of the modules (see Item 102-3) is not included in the Grant Budget. The Budget (Table H) was approved.

Table G  
SUMMARY OF GRANT FUNDING  
(From beginning to 12/31/87)

Total funds authorized	\$ 515,189.00
net outlays to date	<u>- 409,905.34</u>
Funds less outlays	105,283.66
unliquidated obligations	<u>- 13,418.05</u>
Unobligated balance of funds	91,865.61

**Table H**  
**GRANT BUDGET 88/89 (July 1, 1988 to June 30, 1989)**

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INCOME	
Funds carried over from prior year	\$ 3,000.00
NBS payment during year	\$ 48,500.00
Total Receipts	\$ 51,500.00
EXPENSES	
Contract 69-1 (1984) <sup>1</sup>	\$ 3,000.00
Other contracts <sup>2</sup>	\$ 38,000.00
Travel	\$ 1,000.00
Secretarial Support	\$ 1,000.00
Module Publication	\$ 3,000.00
Miscellaneous	\$ 5,500.00
Total Expenses	\$ 51,500.00

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<sup>1</sup> Contract with Industrial Training Corporation for Module 22.

<sup>2</sup> To be awarded.

**102-5            I            APPOINTMENTS AND ASSIGNMENTS**

The appointments made by the Chairman and the Committee were reported at the Interim Meeting and at the Annual Meeting.

**1. Appointment by the Executive Committee at the Interim Meeting.**

**EXECUTIVE COMMITTEE**

Don Stagg, AL, to replace Bruce Niebergall, ND, who resigned.

**2. Appointments Reported by the Chairman at the Interim Meeting.**

**EXECUTIVE COMMITTEE**

Pat Nichols, Alameda County, CA, to replace John Bartfai, NY, who became Chairman-elect.

**COMMITTEE ON LAWS AND REGULATIONS**

Barbara Bloch, CA, to replace Trafford Brink, VT, who retired.

**COMMITTEE ON EDUCATION, ADMINISTRATION, AND CONSUMER AFFAIRS**

Max Gray, FL, to replace Ron Hooker, MO, who resigned.

ASSOCIATE MEMBERSHIP COMMITTEE

Kenneth C. Appell, Colgate-Palmolive, Chairman  
Richard L. Davis, James River Corp., Vice-Chairman  
William H. Braun, Procter & Gamble, Treasurer  
Max Casanova, Ramsey Engineering Co.  
Anthony Ladd, A. J. Ladd Weighing & Packaging  
Harvey Lodge, Dunbar Manufacturing, Inc.  
J. Edward Thompson, Kraft, Inc.  
Tom Topalis, The Quaker Oats Co.  
Ray Wells, Sensitive Measurements, Inc.

NTEP TECHNICAL COMMITTEE, PUBLIC MEMBERS

Frank Nagele, MI  
Ken Yee, NBS  
Tina Gaver Butcher, NBS  
(See Item 113-1, Belt-Conveyor Scales, Test Procedures, for additional appointments)

NTEP TECHNICAL COMMITTEE, WEIGHING INDUSTRY SECTOR

Philip Katz, Hottinger Baldwin Measurements  
Harry Lockery, Lockery Associates, Inc.

NTEP TECHNICAL COMMITTEE, BELT-CONVEYOR SECTOR

(See Item 113-1, Belt-Conveyor Scales, Test Procedures, for appointees)

TASK FORCE ON ENERGY ALLOCATION SYSTEMS

(See Item 103-4, Task Force on Energy Allocation Systems, for appointees)

3. Appointments Reported by the Chairman at the Annual Meeting.

EXECUTIVE COMMITTEE

Jim Melgaard, South Dakota, to replace Jim Lyles who retired.

VICE CHAIRMAN

Carol Fulmer, South Carolina, to replace Tom Scott who retired.

COMMITTEE ON EDUCATION, ADMINISTRATION, AND CONSUMER AFFAIRS

G. W. Diggs, VA, to replace Tom Scott, NC, who retired.

LIAISON COMMITTEE

Kathy Thuner, San Diego, California, to replace Paul Engler who retired.

SERGEANTS-AT-ARMS

Rod Jordan, Michigan  
Ron Reedy, Michigan

NTEP TECHNICAL COMMITTEE, MEASURING INDUSTRY SECTOR

Richard Whipple, Gilbarco, Inc., as Chairman of the Sector  
Vic Rasheed, Executive Director, Service Station Dealers of America

102-6 I ANNUAL MEETING, 73RD

The following report was given by the Executive Secretary at the Interim Meeting.

Meeting Location

The 73rd Annual Meeting will be held July 17-22, 1988, in Grand Rapids, Michigan, at the Amway Grand Hotel; the rates are: \$69 single; \$79 double.

Host State Officials, Waiving of Fee

In accordance with Conference policy, \$100 of the \$135 registration fee will be waived for the weights and measures officials of the host state (Michigan) who have never attended an Annual Meeting of the Conference. Those officials who pay \$35 (1) will not have voting rights at the meeting, but (2) will be considered to be members of the Conference for the year July 1988-June 1989 and will receive all other benefits of membership, including the publications of the Conference.

Promotion of Meeting

Each Registrant will be given a parchment-like certificate quoting Resolution No. 7 of the 24th Congress of the United States, Session I, 1836, that directed the Secretary of the Treasury to "cause a complete set of all the weights and measures adopted as standards to be delivered to the Governor of each State of the Union". The first sets were delivered in 1838; the NCWM will be recognizing the 150th anniversary of the first deliveries at the 73rd Annual Meeting. The 200th Anniversary of the United States Constitution will also be celebrated.

Additional plans for this meeting are described in the Report of the Committee on Liaison.

The Amway Grand Plaza Hotel

The Grand Plaza Hotel is a AAA 5-Diamond Award and the Mobil Four-Star property with 682 guest rooms. There is 24-hour room service, concierge assistance, and nightly turn-down service. There are 12 restaurants and lounges throughout the hotel. The lobby and concourse levels of the hotel contain a dozen shops. The hotel has a fitness center with a workout room, a glass enclosed swimming pool, two outdoor tennis courts, one racquetball court with gallery viewing, a sauna, and a tanning booth.

Location and Transportation

The hotel is located in a downtown complex in the heart of Grand Rapids. A sky-walk connects the hotel with the Gerald Ford Museum.

The hotel is less than 20 minutes from the Kent County International Airport. Eight major carriers, including American, Northwest, Piedmont, United, and USAir provide more than 100 arrivals daily with direct service to more than 50 cities. The hotel operates shuttles between the hotel and the airport.

The hotel is only two blocks from U.S. 131 and Interstate 96 highways. The hotel has its own 750-car parking lot.



102-7 I ANNUAL MEETING, 74TH

Meeting Location

The proposals received from hotels in Seattle, WA contained rates considerably higher than the NCWM has experienced in the past. However, most of the comments from NCWM members reported at the Interim Meeting indicated their desire to meet in Seattle in spite of the higher rates.

The Seattle Westin Hotel was selected as the location for the 74th Annual Meeting; the rates are: \$100 single; \$115 double.

102-8 I ANNUAL MEETING, 75th

Albany, NY, was selected at the 72nd Annual Meeting as the location for the 75th Annual Meeting.

The Executive Secretary reported on his site visit to Albany, including meetings with the Convention Bureau and personnel of several hotels (Appendix C).

102-9 I ANNUAL MEETING, 76th

In order to continue the tradition of holding the Annual Meeting in the various regions of the country, the Executive Secretary recommended, and the Executive Committee agreed, that he explore possibilities in Nashville, TN, Orlando, FL, and New Orleans, LA. Presentations were made by representatives of Tennessee and Louisiana at the Annual Meeting.

102-10 I ANNUAL MEETINGS, OTHER

The NCWM has received invitations from the following jurisdictions to host the Annual Meeting: Hawaii (various locations), Indiana (Indianapolis), Ohio (Columbus), Connecticut (Hartford), and Arizona (Phoenix).

NCWM PROGRAMS

103-1 I NATIONAL TRAINING PROGRAM

Status of Development and Funding

The development and use of the training program was reviewed. See Report of the Committee on Education, Administration, and Consumer Affairs for details.

Progress on the program continues to be impressive. Ten modules have been completed; five more are expected to be completed using the remaining funds under the Grant. At the discussion of the National Training Program, no source of funding had been identified beyond that authorized under the Grant. However, later in the week of the Interim Meeting, Dr. Ambler asked about the status of the Program. He was told that 15 modules are expected to be completed with the Grant Funds, but that the Committee on Education, Administration, and Consumer Affairs believes that six additional modules should be developed in order to satisfy the primary needs of the states. Dr. Ambler asked the Executive Secretary to provide him with a proposal for additional funding by the NBS.

Subsequent to the Interim Meeting, the National Bureau of Standards increased the funding for development of new modules by \$60,000 in the current fiscal year.



## Executive Committee

### Use of Modules by the States

The use of the modules and participation in the registration and certification programs by the states was reviewed (see Report of the Committee on Education, Administration, and Consumer Affairs for details).

Use of the modules has been significant but the rate of increase in their use has slowed down due to the limited availability of classroom instructors to conduct training. Most initial training to date has been conducted by staff of the Office of Weights and Measures.

This situation is likely to continue unless additional instructors can be developed on the staffs of the states. The Committee on Education, Administration and Consumer Affairs plans to:

1. develop materials for use in teaching instructor skills to prospective state instructors, funding that effort with the budget item included in the NCWM Operating Budget for this purpose (\$10,000); and
2. cooperate with similar efforts of the Western and Southern Weights and Measures Associations.

### Design of Certificate

In response to a recommendation, the design of the Certificates awarded to those state officials who have successfully completed the requirements of the modules will be varied to avoid their becoming "commonplace".

## 103-2 V TASK FORCE ON COMMODITY REQUIREMENTS

(This item was adopted.)

### Summary

The Task Force on Commodity Requirements was charged with developing technical procedures for dealing with moisture loss in the testing of meat, poultry, and flour packages. The Task Force presented the results of its work on flour at the 72nd Annual Meeting. The Conference adopted policy and test procedures for flour at that meeting. Since then, the Task Force developed policy and test methods for checking meat and poultry packages from Federally-inspected plants.

The Task Force's report on meat and poultry is reported in Appendix D.

At the Annual Meeting, the Executive Committee accepted the following recommendations of the Task Force:

- a. Adopt the test procedures for meat and poultry packaged in Federally-inspected plants as reported by the Task Force for inclusion in Handbook 133 (see paragraph 1 below).
- b. The state weights and measures jurisdictions should enter into the "Model Agreement Between a State or Local Government and Food Safety and Inspection Service, USDA" (see paragraph 2 below).
- c. Businesses and industries that are interested in resolving the problem of moisture loss in other packaged product area should follow the guidelines provided in the Report of the Task Force (see paragraph 3 below).
- d. Make assignments to the Committee on Laws and Regulations and the Committee on Liaison for the continuation of this work (see paragraph 4 below).
- e. Disband the Task Force at the 73rd Annual Meeting.

1. Adoption of Gray Area for Testing of Meat and Poultry.

The results of the pilot study on meat and poultry indicate that the gray area approach, as adopted by the Conference in July 1987 for flour, can be used to determine compliance of meat and poultry products and should be extended to meat and poultry products packaged at Federally-inspected plants.

The committee recommends that the membership adopt the following recommendation of the Task Force for inclusion in NCWM Publication #3 as Policy 2.5.3. concerning wet tare tests on packages from Federally-inspected plants in NBS Handbook 133.

Wet Tare Tests on Packages from Federally-inspected Plants

The following gray areas should be applied in wet tare tests used to determine net weights:

- 2-1/2% of the labeled weight for hot dogs or franks (whether meat or poultry)
- 3% of the labeled weight for fresh poultry

2. Model Agreement.

Subsequent to the Interim Meeting, Attachment B, "Model Agreement Between a State or Local Government and Food Safety and Inspection Service, U.S. Department of Agriculture" of Appendix D to this report, "Report of the Task Force on Commodity Requirements to the Executive Committee" was amended. The amendments were reviewed through two mail ballots to members of the Task Force, the Executive Committee, and Committee on Laws and Regulations. Add the "Model Agreement" in Attachment B of Appendix D to NCWM Publication #3 "Policy Guidelines, and Interpretations" as Policy 2.5.4.

3. Guidelines for Recognition of Moisture Loss.

Add the Guidelines in Attachment D of Appendix D as new Policy 2.5.5. These guidelines are intended for business and trade associations to use in preparation for requests to the Conference for specific procedures concerning products susceptible to moisture loss.

4. Committee Assignments.

The Executive Committee made the following committee assignments based on the recommendations of the Task Force; they will be incorporated into NCWM Publication #3, "NCWM Policy, Interpretations, and Guidelines".

- a. Add the following to Policy 1.1.3. Goals and Objectives of the Committee on Laws and Regulations:
  - 6. Administer the "Guidelines for NCWM Resolution of Requests for Recognition of Moisture Loss in Packaged Products".
  - 7. Develop a procedure for use in periodically reevaluating the gray area values.
- b. Add the following assignments for the Liaison Committee as new Policy 1.5.4.

1.5.4. Moisture Loss, Coordination for Development of Testing Methods

The Committee on Liaison will support the L&R Committee in its work on moisture loss issues by:

## Executive Committee

- (1) **handling the external liaison associated with each request from an industry group for moisture loss recognition, and**
- (2) **coordinating data collection with appropriate Federal agencies and weights and measures agencies.**

### c. Undertake the following tasks:

- (1) Committee on Liaison to work with the U.S. Department of Agriculture to amend the draft memorandum of understanding to include (a) clarification by limiting and defining the amount of time for a Federal decision to be made on whether or not to grant entry to a local weights and measures official, and (b) a definition of non-nutritious media.
- (2) Committee on Laws and Regulations and Committee on Liaison to address the problem of moisture loss in ice-packed bulk poultry from Federally-inspected plants.

## 103-3 I TASK FORCE ON PREVENTION OF FRAUD

The National Conference on Weights and Measures (NCWM) Task Force on Prevention of Fraud was established in the fall of 1986 by past Conference Chairman Frank Nagele (MI). Chairman Nagele asked the Task Force to investigate the ways in which weighing and measuring devices are used to cheat the public, to assess the NCWM's role with regard to the prevention of fraud, and to make recommendations to the Conference as necessary to strengthen state effectiveness in preventing fraud.

The Task Force has probed the issue, including the design and administration of a survey of the states. It has analyzed and integrated the results of the survey with information gathered from meetings and correspondence and developed a comprehensive report (Appendix E) that was presented to the Executive Committee.

After reviewing the Report of the Task Force on Prevention of Fraud, the Executive Committee arrived at the decisions described below.

1. Request the Office of Weights and Measures to explore and develop, if possible,
  - (a) a definition of fraud,
  - (b) a uniform method of classifying types of fraudulent activities for use as the basis of state information systems,
  - (c) a mechanism by which information on fraudulent activities could be collected and made available at the national level,
  - (d) recommendations for contents of a module in the National Training Program for use by the states in complaint handling and reduction of opportunities for fraud based on items (a), (b), and (c) above plus information available from other enforcement agencies, associations, and classroom curriculum, and
  - (e) recommendations for assessment of penalties and other legal action.
2. Assign to the Committee on Specifications and Tolerances the task of determining if changes to NBS Handbook 44 are required to reduce opportunities for fraud.
3. Disband the Task Force on Fraud with appreciation for its hard work and useful recommendations.

## 103-4 I TASK FORCE ON ENERGY ALLOCATION SYSTEMS

The Chairman established a Task Force on Energy Allocation Systems. The Task Force was requested to:

- identify the various types of systems and measurement equipment used by landlords for allocating energy costs among the occupants in multi-unit residences or offices;
- identify the agencies and associations having responsibilities regarding such systems and measurement equipment;
- gather existing regulations relating to such systems; and
- recommend appropriate action to the Executive Committee concerning the role of the National Conference on Weights and Measures, and state and local weights and measures jurisdictions, regarding these systems and equipment, including, if appropriate, (1) draft uniform regulations, (2) draft specifications for these systems, and (3) establish guidelines for state and local weights and measures officials to use in responding to complaints about these systems.

The members appointed to the Task Force are listed below:

Chairman: Pat Nichols, California (Alameda County)  
 Technical Advisor: Tina Butcher, NBS/OWM

Public Sector Members:

Colorado - Dave Wallace  
 Maryland - Dick Shockley  
 Ohio (Montgomery County) - Robert Omlar  
 Pennsylvania (Bucks County) - Peggy Adams  
 West Virginia - Jim Rardin

Private Sector Members:

Borg Warner - James Boggs  
 GRH Electronics - Ken Hoberman  
 DieBold, Inc. - Russ Lebo

The Task Force report appears in Appendix F.

## 103-5 I ISSUES ROUNDTABLE

The use of "Issues Roundtables" at the NCWM and Regional Association Meetings was reviewed and found to be useful and informative. The Executive Committee decided to continue the session on issues at the Interim Meeting and recommends that the Regional Associations continue to conduct roundtables at their annual meetings.

## 103-6 V PROGRAM UPDATE, INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY (OIML)

(This item was adopted.)

1. Policy - NCWM Member of U.S. Delegation to OIML International Conference.

Upon review of the former NCWM policies and the new policy regarding NCWM participation in OIML activities (see paragraph 2 below), the Executive Committee concluded that the policy was not clear regarding the selection of the NCWM member for the U.S. Delegation to the OIML International Conference on Legal Metrology. This Conference meets every four years and decides



## Executive Committee

on Recommendations to be made for common action by Member States (OIML, Constitution of the Organization, Article VIII).

Article VII of the OIML Constitution specifies that "Member States shall delegate a maximum of three official representatives to meetings of the Conference. As far as possible one of them shall be a serving official in his country, in the Weights and Measures or other department dealing with legal metrology." The U.S. Delegation has been composed of (1) the official representative of the United States to the International Committee of Legal Metrology, (2) the Chief of the Office of Weights and Measures, and (3) the Chairman of the National Conference on Weights and Measures serving at the time of the meeting of the International Conference.

The United States has authorized others as part of the Delegation, including a representative of the Scale Manufacturers Association.

For the upcoming meeting in Sydney, Australia (the Eighth International Conference), the Delegation will include Stan Warshaw (NBS), Sam Chappell (NBS), Al Tholen (OWM, NBS), and John Bartfai (who will be the Chairman of the NCWM at the time of the International Conference).

The Executive Committee will draft a proposed procedure for selection of the NCWM member of the Delegation for discussion with the OWM and review at the Interim Meeting in January 1989.

2. Policy - NCWM Participation With OIML Committees. NCWM Policy 1.5.1, "International Organization of Legal Metrology, NCWM Participation," was adopted at the 72nd Annual Meeting to replace three former policy statements.

The Executive Committee recommended that PART II of the NCWM Policy 1.5.1 be amended as follows:

### NCWM REVIEW OF OIML RECOMMENDATIONS AND DOCUMENTS

#### PARTICIPATION ON OIML COMMITTEES

- A. This policy applies to selection of NCWM members for OIML Pilot and Reporting Secretariats and the United States National Working Groups (USNWGs) overseeing these Secretariats. It does not apply to representation on the U.S. Delegation to the International Conference.
- B. The Executive Committee will decide which Pilot and Reporting Secretariats are of interest to the NCWM and will promote participation of its members on the various USNWGs overseeing these secretariats.
- ~~A~~ C. The NCWM Chairman and Executive Secretary shall jointly receive and coordinate invitations or requests for NCWM participation in these OIML activities.
- ~~B~~ D. Members selected for participation in the meetings of the OIML activities should be qualified to represent the NCWM to ensure close coordination of the work and scope of the NCWM committees and of the OIML organization.
- ~~C~~ E. Selection of NCWM members for participation will be determined as follows:
  - 1. Requests will normally be referred to the appropriate NCWM Committee, in which case the Committee will recommend to the Chairman by letter the NCWM member believed to be fully qualified. The Chairman may exercise the right to make the selection without reference to a Committee if the subject matter is not covered by the standing committee.

2. The Chairman, in consultation with the Executive Secretary, shall make the final NCWM selection and forward the name of the nominee to the Office of Standards Management.

D E. The role of the NCWM representative is of special significance in that he or she may be the first NCWM member having knowledge of the recommendations being developed. As the NCWM representative, the member:

1. will keep the sponsoring standing committee current on the progress of the OIML activity; and
2. will promote the policies of the NCWM, seeking guidance through the Committee structure if a question arises regarding the policy and/or position of the NCWM.

3. OIML Program. Dr. Sam Chappell reported on activities since the Interim Meetings (see Addendum Sheets for the Liaison Committee Report).

4. Proposals on Certification. The Executive Committee was provided with this draft but did not have enough time or information to develop a consensus position prior to the Annual Meeting. The Committee will discuss this draft at the Interim Meeting and expects to reach a position. The Committee will solicit comments on the proposal from the associate membership.

#### 103-7 I PROGRAM UPDATE, OFFICE OF WEIGHTS AND MEASURES

Mr. Albert Tholen provided an update on the program of the Office. Highlights included (see Appendix G for details of the update):

- the addition of a new member to the staff, Mrs. Tina Gaver Butcher, who had previously worked for the Maryland weights and measures program; and
- the acquisition of a "desktop publishing" system to provide new and expanded capabilities to OWM in the preparation of NBS and NCWM documents.

### PART II

#### NATIONAL TYPE EVALUATION, ADMINISTRATION AND POLICY

##### 111-1 I NCWM PUBLICATION #14

NCWM Publication #14. This publication, "National Type Evaluation Program, Administration Procedures, Technical Policy, Checklists, and Test Procedures," has been printed and mailed to all state directors. It is available on request.

The Executive Committee decided that this document will remain an NCWM publication; there is no justification for it to be published as a NBS Handbook.

October Meeting of the Technical Committee. The Technical Committee on National Type Evaluation, Weighing Industry Sector, met on October 28-29, 1987. Some of the members of the Board of Governors attended this meeting. The Board of Governors met on October 30 to address issues passed to the Board by the Technical Committee. The summary of these two meetings is in Appendix H, Part I. The reader is invited to refer to Appendix H, Part I for the discussion of each of the addressed items leading to the action taken by the Board of Governors on items which affect NTEP policy.

June Meeting of the Technical Committee. The Technical Committee on National Type Evaluation, Weighing Industry Sector, met on June 22-23, 1988. The Board of Governors attended these sessions and then met on June 23-24, 1988 to review the recommendations of the Technical Committee and attend to other Board business. The summary of the Technical Committee Meeting is contained as Appendix H, Part II of the Final Report of the Executive Committee.

Actions of the Board of Governors which change policy contained in NCWM Publication #14 are reported below as sub items of this Reference Key Item.

**111-1A          I          LOAD CELLS, MULTIPLE CELL APPLICATIONS  
NUMBER OF CELLS TO BE TESTED**

See Reference Key Item 113-3.

**111-1B          I          LOAD CELLS, MULTIPLE CELL APPLICATIONS,  $v_{min}$**

See Reference Key Item 113-3.

**111-1C          I          LOAD CELL ASSEMBLIES, TESTING**

Add the following to Part II, Section 2, Load Cells under Paragraph A. Program Description (See Appendix H, Part II, Item XV):

**NTEP does not have the facilities for and will not, therefore, test large load cell assemblies. Manufacturers will be expected to provide the test data needed by NTEP to make decisions for issuance of Certificates of Conformance.**

**111-1D          I          LOAD CELLS, TEMPERATURE AFFECT ON  
MINIMUM DEAD LOAD OUTPUT (MDLO)**

Modify Part II, Section 2, Load Cells, Paragraph O. Procedures to include the following (See Appendix H, Part II, Item III. See Item 113-3 for additional discussion):

- A.      Determine the temperature effect on the minimum dead load output based on the temperature tests for cell accuracy.**
- B.      Do not zero the indicator before starting each test because the actual values are needed for data analysis. Data sets will be rejected if the indicator is zeroed before each run and the necessary data is not available.**

**111-1E          I          LOAD CELLS, TEMPERATURE TESTING**

Modify Part II, Section 2, Load Cells, Paragraph O. Procedures to include the following (See Appendix H, Part II, Item I):

- A.      First and last temperature for testing will be 20 °C unless the temperature range is significantly different from -10 °C to 40 °C, in which case the first and last temperature for testing will be near the midpoint of the extremes. This same approach will be used for scales.**
- B.      All points must be within tolerance.**
- C.      The 60-minute creep test and current tolerances will be applied.**



In the future, NTEP will consider requiring that only the average be within tolerance provided that appropriate repeatability requirements are developed. NTEP will also consider adopting the 30-minute creep test proposed for OIML IR 60.

**111-1F            I            LOAD CELLS, CLASS III L APPLICATIONS, TEST LOADS**

Add the following to Part II, Section 2, Load Cells, Paragraph O. Procedures (See Appendix H, Part II, Item VII):

**Test loads should be applied within 250v of 500v and 1000v. This requires two test loads below 2000v. Only Provisional Certificates of Conformance will be issued if this requirement cannot be met.**

The Board of Governors will reexamine this issue in November based upon information of whether or not the NBS and manufacturers' testing laboratories are able to meet this requirement.

**111-1G            I            LOAD CELLS, FAMILIES, EXTENSION OF RANGE**

Add the following to Part II, Section 2, Load Cells, Paragraph H. Load Cells to be Submitted for Test (See Appendix H, Part II, Item VIII):

**Full Certificates of Conformance will not be amended to include load cells of the same family but outside the ranges covered by the C of C. Instead, Provisional Addendums or Certificates of Conformance will be issued following the normal procedure.**

**111-1H            I            LOAD CELLS, MARGINAL TEST DATA**

Add the following to Part II, Section 2, Load Cells, Paragraph H. Load Cells To Be Submitted For Test. (See Appendix H, Part II, Item IX):

**NTEP may require that additional load cells be tested if test data is marginal. Test data will be evaluated on a pass/fail basis.**

**111-1I            I            INDICATORS, REMOTE (SLAVE), MARKING**

The Committee on Specifications and Tolerances has been requested to address this issue by defining the meaning of "not permanently attached" and what equipment is interchangeable.

Pending resolution by the Committee on Specifications and Tolerances,

1. Add the following footnote to Part II, Section 1, Digital Electronic Scales table of "Devices To Be Tested For Influence Factors". (See Appendix H, Part II, Item X):

**NTEP will not require testing of slave indicators for conformance to the influence factors; field enforcement is considered sufficient.**

2. Add the following to Part II, Section 1, Digital Electronic Scales, Code Reference S.6.9. marking - Indicating Elements (See Appendix H, Part II, Item X):

3.     **The value of  $n_{max}$  must be marked on the main indicator for a system using slave indicators.**

**111-1J            I            MARKINGS, CERTIFICATE OF CONFORMANCE NUMBER**

The SMA Technical Committee will explore the potential for requiring marking of devices with the Certificate of Conformance number in lieu of other markings currently required. The purpose of such a change is to reduce the amount of information required to be marked on a device. Use of the C of C number could be used by the inspector to cross-reference a record of NTEP data. (See Appendix H, Part II, Item XI.)

**111-1K            I            CERTIFICATES OF CONFORMANCE, DISTRIBUTORS**

The following policy is to be applied retroactively to load cells; it will be reviewed to determine the practicality of applying it retroactively to all devices (See Appendix H, Part II, Item XII).

Add the following to Part I, Paragraph G. Variations in Type Evaluation:

**6. Evaluation of Relabelled Load Cells (single suppliers)**

A distributor, who sells load cells and/or devices manufactured by another company and relabels to sell as his product must submit a request for a Certificate of Conformance accompanied by:

- a. a statement that the device is the same as the original type (except for proprietary markings), and
- b. a letter addressed to NTEP by the original manufacturer stating that the company is providing the load cell or device to the distributor, that the labelling is authorized, and that the device provided to the distributor is identical to the original type for which a C of C was issued and meets the same specifications and requirements.

**7. Evaluation of Relabelled Load Cells (multiple suppliers)**

A distributor, who relabels equivalent load cells of devices (products from multiple suppliers) must:

- a. satisfy the requirements in Paragraph 6a above for each type from each manufacturer, and
- b. assign a unique model designation to each type from each manufacturer. The same model series may be used, but unique prefixes or suffixes must be used.

**111-1L            I            SUMMING BOXES**

Add a Note to Part II, Section I, Digital Electronic Scales, table of "Devices To Be Tested For Influence Factors". (See Appendix H, Part II, Item VI):

**Note 3:            Summing Boxes**

**NTEP will not require summing boxes to be tested for influence factors.**

If future developments indicate that this testing may be beneficial, the Board will reconsider this issue.

# 111-1M      I      SCALES, LARGE CAPACITY, TESTING LOCATION

Add the following to Part II, Section 1, Digital Electronic Scales, Performance and Permanence Tests For Scales and Electronic Cash Registers (General) under "Field Permanence Tests" (See Appendix H, Part II, Item XIII):

Although the preferred site for testing large capacity scales is the location where the scale will be used, the NTEP will consider testing at the manufacturer's plant.

## 111-2      I      SCALES, PRE-NTEP APPROVED

See Appendix I.

The Board of Governors established the following policy for inclusion in NTEP Publication #14, Part I, Paragraph G. Variations in Type Evaluation:

### 5. RECOGNITION OF PRE-NTEP APPROVED DEVICES

1. Pre-NTEP Provisional Certificates of Conformance will be issued to those devices that: (a) are not affected by the influence factors; (b) satisfy the NTEP requirements; and (c) are based upon the evaluation by another jurisdiction.
2. Manufacturers of these devices must request that a Certificate of Conformance be issued and provide copies of the certificates of approval.
3. If NTEP determines that adequate testing was performed and the device has not been modified from the original device design, then a provisional certificate will be issued.
4. The provisional certificates will be distributed to the States. State Directors will be asked to report (within 90 days of receipt) if their experience indicates that the devices do not comply with Handbook 44. Any objections will be reviewed by the Board.
5. If there are no unfavorable responses, a full Certificate of Conformance will be issued for the device within 120 days from the date the provisional certificate was distributed to the States.

## 111-3      I      SYSTEM "UPGRADE" EVALUATION

The Board of Governors adopted the following policy for inclusion in NTEP Publication #14, Part II, Section 2. Load Cells, Paragraph H. Load Cells to be Submitted For Test:

If a system "upgrades" a load cell above the accuracy class or the number of scale divisions for which the load cell has been separately tested, then the load cell and indicator must be type-evaluated together. The tolerance is 0.7 times the tolerance for the complete scale. In the case of scale conversions from weighbeam or dial indicators to a digital indicator with a load cell, then the "modified portion" of the scale, that is, the load cell and indicator, must be tested together and must meet the new requirements.

## 111-4      I      MANUFACTURED DEVICES, CONFORMANCE

The Board of Governors adopted the following policy for inclusion in NCWM Publication #14, Part I, Paragraph M. Certificate of Conformance:

## 6. POST-EVALUATION RESPONSIBILITY OF MANUFACTURER

As a result of requesting an evaluation and accepting the Certificate of Conformance, the manufacturer implicitly asserts that all devices manufactured as the type referenced in the Certificate of Conformance are the same type.

Questions regarding the conformance of manufactured devices to the "type" for which a Certificate of Conformance was issued will be addressed using the existing verification system based on the following premises:

1. existing NTEP policies are sufficient to address production devices;
2. NTEP is limited to the initial type evaluation of devices;
3. field enforcement process is responsible for assuring that production devices comply with Handbook 44; and
4. if the field verification process reveals a history of abnormally high device failure, this information may be used in withdrawing a Certificate of Conformance for cause.

## 111-5 I REPLACEMENT PARTS, CONFORMANCE

The Board of Governors adopted the following policy for inclusion in NCWM Publication #14, Part II, Section 2, Paragraph A:

### 3. REPLACEMENT PARTS

The policy for addressing the conformance of replacement parts with the parts being replaced is:

- a. If a scale had a type evaluation before 1986 and the load cells were not tested for compliance with the 1986 (or later) H-44 requirements, then the load cells in the scale may be replaced with load cells that have not been tested for compliance with the 1986 (or later) H-44 requirements. Consequently, scale and load cell manufacturers may use equipment that has not been evaluated for compliance with the influence factors requirements as replacement parts for scales approved prior to 1986 and manufactured prior to 1988.
- b. If a load cell is placed in a steelyard rod and a digital indicator is installed after January 1, 1988, this is a modification of the original type and the modified scale with the digital indicator must meet the 1986 (or later) H-44 requirements. However, if the previous weighbeam or dial indicator is retained as a back-up indicator, the back-up indicator may remain as an unmarked scale.
- c. If a scale has load cells that meet the 1986 (or later) H-44 requirements, then the replacement load cells must meet the 1986 (or later) H-44 requirements.
- d. All load cells used in scales over 2,000 lb capacity, manufactured after January 1, 1988, must meet the 1986 (or later) H-44 requirements.

## 111-6 I REPAIR OR REMANUFACTURE OF LOAD CELLS

The Board of Governors adopted the following policy for inclusion in NCWM Publication #14, Part II, Section 2, Paragraph A:

### 4. REPAIRED OR REMANUFACTURED LOAD CELLS

The following policy applies to the repair or remanufacture of load cells:

- a. The original Certificate of Conformance is no longer applicable to a repaired load cell if that load cell is repaired by other than the original manufacturer or authorized agent.
- b. The weights and measures jurisdiction has the authority and responsibility to ensure that the device complies with T.N.8. by requiring an NTEP evaluation or the jurisdiction's own evaluation.

## NATIONAL TYPE EVALUATION, OPERATIONS

### 112-1 I ACCEPTANCE BY THE STATES

The implementation of the NTEP and the subsequent acceptance of the program by the states has been reviewed.

Most states participate in the NTEP program by accepting a Certificate of Conformance as evidence that a device meets the requirements of NBS Handbook 44. In some cases, states that have type evaluation requirements on their books have taken legislative and/or administrative action to participate in NTEP. Although the acceptance of NTEP Certificates of Conformance is widespread, the acceptance in many states is not formalized in state law or regulation. Manufacturers report instances of nonacceptance of the Certificates of Conformance that cause hardship.

Conclusion: The Executive Secretary will (1) continue to work with the states to formalize their participation in the NTEP process, and (2) follow up on reported cases of nonacceptance and attempt to resolve them.

In recent months, device manufacturers have asked NTEP which states

1. are applying the 1988 NBS HB 44 new Scales Code, and
2. have adopted the Uniform Regulation for National Type Evaluation (or, because of provisions already in their law, are routinely using NTEP and requiring Certificates of Conformance).

These questions are usually associated with observations that many states are not applying the new Scales Code and do not require Certificates of Conformance prior to placing devices into service in their states.

The Scale Manufacturers Association and individual manufacturers, without identifying states of concern, have complained that neither of the above has been accomplished in many states. The net result is that devices that meet the code requirements must compete with devices not manufactured to meet the code. This situation penalizes members who have worked in good faith (and at considerable expense) to meet the latest requirements adopted by the NCWM. It also results in the sale and use of devices that do not meet the code requirements, or for which there is inadequate evidence meeting code requirements.



## Executive Committee

There is a practical need to know the status of application of the new Scales Code and the degree of use of the NTEP in each state in order to:

1. work cooperatively with those states that need assistance (including training) in either of these two areas;
2. provide answers to manufacturers and distributors; and
3. update NBS and NCWM publications following the Annual Meeting.

The Board reviewed a letter that OWM plans to send to every state requesting information describing its current operating procedures regarding these matters. An attachment to the letter provides a comprehensive discussion of (a) the background leading up to the adoption of the new scales code and NTEP, and (2) detailed "Steps in Field Enforcement", especially in light of the fact that states cannot test devices in the field for compliance with "influence factors." The Board supports the action of the OWM and will monitor progress in resolving this issue.

### 112-2 I PARTICIPATING LABORATORIES

The Executive Secretary reported on the authorized Participating Laboratories and their evaluation capabilities and activities. In addition to the NBS, California, Ohio, and the Federal Grain Inspection Service are Participating Laboratories. NBS, California, and Ohio have operating environmental chambers for testing scales under 2000 pounds capacity.

NBS is working with other states that have expressed the intention to be Participating Laboratories, including New York, Alabama, and North Carolina.

### 112-3 I STATUS OF CERTIFICATES OF CONFORMANCE ISSUED AND THE BACKLOG

The Executive Secretary reported on the NTEP evaluation activities, including the testing completed by each Participating Laboratory and Certificates of Conformance issued. A summary of his report is shown on the next page.

#### Backlog

The extent, causes, and plans for the reduction of the backlog in conducting evaluations and issuance of Certificates of Conformance was discussed. The Board of Governors discussed a letter received from the Scale Manufacturers Association (see Appendix J) containing recommendations to alleviate complaints of their members regarding the backlog.

The Executive Secretary addressed the backlog, observing that it is primarily associated with three aspects of the evaluation process:

1. the late submission (with respect to the January 1, 1988, effective date for all requirements of the scales code, especially the T.N.8 requirements) of requests for evaluation;
2. the relatively large effort associated with arranging for and conduct of evaluations of large capacity scales, including the permanence tests; and
3. until recently, the limited capability in OWM for reviewing test results and drafting Certificates of Conformance.

The Executive Secretary estimated that the backlog will dwindle during the next few months as a result of added staff in OWM, the completion of the NTEP data base system, the addition of New York (and possibly North Carolina) as Participating Laboratories, and requests for evaluations tapering off.

The imposition of any new ad hoc procedures or tasks would simply exacerbate the situation. The Executive Secretary stated that it would be unfair to take time away from serving those who have been in the process to temporarily service new applicants for evaluations.

Conclusion: The Board of Governors will monitor the backlog, and will not take action unless the problem gets worse.

**Table G**  
**CERTIFICATES OF CONFORMANCE ISSUED**

Year Issued	Number Issued
Full Certificates	
1985	75
1986	80
(Using 1985 Criteria)	43
(Using 1986 Criteria)	37 <sup>1</sup>
1987	90
Provisional Certificates	
1986 (Load Cells)	9
1987 (Load Cells)	32

<sup>1</sup> 25 Certificates were issued on testing on the conformance to the requirements of the Influence Factors.

**Table H**  
**EVALUATIONS CONDUCTED BY JURISDICTION**

Evaluations performed by	In 1985	In 1986 using 1985 criteria	In 1986 using 1986 criteria	In 1987
California	28	20	10	46
Ohio	2	4	3	24
Kansas (for NBS)		5		
FGIS	2	1		
NBS (Full)	43	13	24 <sup>1</sup>	20
NBS (Provisional)			9	32
TOTAL	75	43	46	122

<sup>1</sup> Only NBS and California had environmental chambers in 1986.



**113-1            I            BELT-CONVEYOR SCALES, TEST PROCEDURES**

The Chairman established a new Belt-Conveyor Sector under the Technical Committee on National Type Evaluation. The Committee has been requested to develop the criteria and test procedures to be used by NTEP in conducting type evaluations of belt-conveyor scales to determine their conformance with the requirements of NBS Handbook 44. The appointments to the Committee are listed below:

Chairman: Peter Perino, Transducers, Inc.  
Technical Advisor: Henry Oppermann, NBS/OWM

Public Sector Members (other public sector members may participate):

Alabama - John Rabb  
Arizona - Ray Helmick  
Colorado - Dave Wallace  
New Mexico - Fred Gerke  
NBS - Otto Warnlof

Private Sector Members:

ABC Scale - Shawne Gibson  
Association of American Railroads - John Robinson  
Autoweigh - John MacFarlane  
Central Illinois Public Service Co. - R. DeSollar  
Consultant - Martin Gruber  
Consumers Power - Gerald Burger  
CSX Transportation - Joe Lloyd  
Industrial Weighing Consultants - Darryl Boyd  
Merrick - Norman Johnson  
Milltronics - Kenneth Knapp  
Ramsey Engineering-Max Casanova  
Revere - Nick Ortyle III  
Riede - Gar Kachel  
Scale Manufacturers Association - Daryl Tonini  
Sensortronics - Ted Johnson  
Southern Company Services, Inc. - W. N. Thurman  
Stock Equipment - Robert Epperson  
Technetics - Jerry Berger  
Thayer Scale - Mitchell Hescow  
Virginia Power - Dan Skelton  
Weighing and Control - Dan Cockrell

**113-2            I            CHANGE IN PERFORMANCE CHARACTERISTICS**

The Board of Governors adopted the following policy for inclusion in NCWM Publication #14, Part I, Paragraph J.2.c. Considerations Preceding Evaluation:

**c.            Marking**

**Any device modified to meet the influence factors requirements must carry a model designation different from the previous model. The differentiation may simply be a prefix or suffix to the original model designation. The device may still carry the same model series designation on the device, but the model designation on the identification badge must be unique.**

113-3

I      MULTIPLE LOAD CELL APPLICATIONS

The Board of Governors reconfirmed its policy requiring that two load cells be tested for multiple load cell applications (see Appendix H, Part II, Item V).

The Board also adopted the recommendation that the tolerance to be applied for analyzing load cell test data for the temperature effect on minimum dead load output for multiple load cell applications be  $1.0 \text{ mV}/5^\circ\text{C}$  (see Appendix H, Part II, Item VIII). Change Part II, Section 2, Load Cells, Paragraph N. Tolerances - Tables accordingly.

D. Guensler, California, Chairman

J. Bartfai, New York, Chairman-Elect

L. Draghetti, Town of Agawam, MA

F. Gerk, New Mexico

J. Lyles, Virginia

F. Nagele, Michigan, Past Chairman

P. Nichols, Alameda County, CA

D. Staggs, Alabama

C. Gardner, Suffolk County, NY, Treasurer

A. Tholen, NBS, Executive Secretary

EXECUTIVE COMMITTEE

**APPENDIX A**  
**WEIGHTS AND MEASURES PUBLICATIONS**

**I - NATIONAL BUREAU OF STANDARDS PUBLICATIONS**

**A. FROM THE U.S. GOVERNMENT PRINTING OFFICE**

The following publications may be obtained from the **Superintendent of Documents**, U.S. Government Printing Office, Washington, DC 20402 (202/783-3238). Please contact them for current price information. Remittance must accompany order.

NBS Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Commercial Weighing and Measuring Devices, 1988 Edition (Sept. 1987) - SN003-003-02820-7\*

NBS Handbook 130, Model State Laws and Regulations, 1988 Edition (Sept. 1987) - SN003-003-02814-2\*

NBS Special Publication 691, INDEX to the REPORTS of the National Conference on Weights and Measures - From the First to the Sixty-Ninth (1905-1984), 1985 - SN003-003-02649-2

NBS Special Publication 734, Report of the 72nd National Conference on Weights and Measures (1987) - SN003-003-02828-2

NBS Special Publication 725, Report of the 71st National Conference on Weights and Measures (1986) - SN003-003-02765-1

NBS Handbook 105-3, Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards - SN003-003-02044-3

NBS Special Publication 304, Metric Chart - SN003-003-02365-5

NBS Special Publication 304A, Brief History of Measurement Systems - SN003-003-02366-3

NBS Special Publication 345, A Metric America - A Decision Whose Time Has Come - SN003-003-00884-2

NBS Special Publication 430, Household Weights and Measures - SN003-003-01542-3

NBS Special Publication 442, Report of the 60th National Conference on Weights and Measures (1975) - SN003-003-01614-4

NBS Special Publication 471, Report of the 61st National Conference on Weights and Measures (1976) - SN003-003-01806-6

NBS Special Publication 517, Report of the 62nd National Conference on Weights and Measures (1977) - SN003-003-01966-1

\*Out of stock as of March, 1988

NBS Special Publication 532, Report of the 63rd National Conference on Weights and Measures (1978) - SN003-003-02045-1

NBS Special Publication 566, Report of the 64th National Conference on Weights and Measures (1979) - SN003-003-02147-4

NBS Special Publication 599, Report of the 65th National Conference on Weights and Measures (1980) - SN003-003-02286-1

NBS Special Publication 684, Report of the 69th National Conference on Weights and Measures (1984) - SN003-003-02637-9

NBS Special Publication 704, Report of the 70th National Conference on Weights and Measures (1985) - SN003-003-02702-2

## B. FROM THE NATIONAL TECHNICAL INFORMATION SERVICE

The following publications may be obtained from the **National Technical Information Service**, 5285 Port Royal Road, Springfield, VA 22161 (703/487-4780 or 4650). Please contact them for current price information - there is a charge per page for paper copies. Remittance must accompany order.

NBS Handbook 143, State Weights and Measures Laboratory Program Handbook (Feb. 1985) - PB85-183358

NBS Handbook 117, Examination of Vapor-Measuring Devices for Liquefied Petroleum Gas - PB 248987

NBS Special Publication 686, State Weights and Measures Laboratories Program Description and Directory (Jan. 1985) - PB85-137651

NBS Special Publication 663, Report of the 68th National Conference on Weights and Measures (1983) - PB841-10998

NBS Special Publication 645, Report of the 67th National Conference on Weights and Measures (1982) - PB831-67148

NBS Special Publication 629, Report of the 66th National Conference on Weights and Measures (1981) - PB821-78997

NBS Handbook 145, Handbook for the Quality Assurance of Metrological Measurements (1986) - PB87140422

NBS Handbook 94, The Examination of Weighing Equipment - COM. No. 73-10635

NBS Handbook 98, The Examination of Farm Milk Tanks - COM. No. 72-10619 (May 1964)

NBS Handbook 99, The Examination of Liquefied Petroleum Gas Liquid-Measuring Devices -- this has recently been replaced by National Training Program Module 21; call 301/975-4007 for information.

NBS Handbook 112, Examination Procedure Outlines for Commercial Weighing and Measuring Devices - COM. No. 73-50836. Replaced by NCWM Publication 12.

C. FROM THE OFFICE OF WEIGHTS AND MEASURES, NBS

The following publications may be obtained from the **Office of Weights and Measures**, National Bureau of Standards, Administration A617, Gaithersburg, MD 20899.

NBS Handbook 133, Second Edition - Checking the Net Contents of Packaged Goods (Oct. 1984)

NBSIR 85-3172, Package Checking Field Manual, to accompany NBS Handbook 133, Checking the Net Contents of Packaged Goods (Aug. 1985) - PB86-108776/AS

NBS Handbook 105-1, Specifications and Tolerances for Field Standard Weights

NBS Handbook 105-2, Specifications and Tolerances for Field Measuring Flasks

NBS Handbook 137, Examination of Distance Measuring Devices

NBS Special Publication 447, Weights and Measures Standards of the United States, A Brief History

Letter Circular 1035, Units and Systems of Weights and Measures, Their Origin, Development, and Present Status

II - NATIONAL CONFERENCE ON WEIGHTS AND MEASURES PUBLICATIONS

The following publications may be obtained from the **National Conference on Weights and Measures**, P.O. Box 3137, Gaithersburg, MD 20878. There is no charge for NCWM members; nonmembers, please call 301/975-4012 for current price.

NCWM Pub 1.	NCWM Constitution and Bylaws, 1987
NCWM Pub 2.	State and Local Weights & Measures Directory 1988 Edition
NCWM Pub 3.	NCWM Policy, Interpretations, and Guidelines 1987
NCWM Pub 4.	NTEP Policy and Procedures 1984 (superseded by NCWM Pub #14)
NCWM Pub 5.	NTEP Index of Evaluations (through 1987)
NCWM Pub 6.	NCWM Organization, Procedures, and Membership Plan Brochure, 1987
NCWM Pub 7.	Weights & Measures Week Guide 1986
NCWM Pub 8.	National Type Evaluation Program and Its Relationship to the Weights & Measures Law, NBS Handbook 44, and the New Scales Code, 1986.
NCWM Pub 9.	Directory - Associate Members, 1988
NCWM Pub 10.	Guide for Conduct of Annual Meeting 1988
NCWM Pub 11.	National Training Program 1987
NCWM Pub 12.	Examination Procedure Outlines, 1987
NCWM Pub 13.	Weights and Measures Information System (WAMIS) Guide 1987
NCWM Pub 14.	NTEP Criteria and Procedures, 1988 -- contains NCWM Publication 4
NCWM Pub 15.	NCWM Interim Meetings Agenda, 1988
NCWM Pub 16.	NCWM Announcement Book 1988
NCWM Pub 17.	NCWM Task Force on Prevention of Fraud, Fraud Survey 1988

## APPENDIX B

**OPERATING BUDGET 88/89**  
**(July 1, 1988 to June 30, 1989)**

The entries in columns (c) and (d) are the amounts budgeted.

The entries in column (f) are the amounts budgeted for the operating year July 1, 1987 to June 30, 1988; these numbers are provided as a basis for comparison.

## INCOME

Account		Budget Amount			Prior Year Budget
Number (a)	Name (b)	Subaccount (c)	Account (d)	Footnotes (e)	(f)
1.1	Registration Fees		\$30,000	1	\$ 30,000
1.2	Membership Fees		45,500	2	45,500
1.3	Training Modules		6,500	3	3,500
1.3	NTP Modules	\$ 6,000			
1.3a	HB 133 Field	500			
1.4	Interest		2,000	4	2,000
1.5	Promotional		1,000	5	1,000
1.6	Special Events		5,000	6	5,000
1.9	Miscellaneous		200	7	200
Total			\$90,200	8	\$ 87,200



EXPENSES

Account		Budget Amount			Prior Year Budget
Number (a)	Name (b)	Subaccount (c)	Account (d)	Footnotes (e)	(f)
2.0	Annual Meeting		\$12,000	9	\$10,000
3.0	Interim Meeting		4,000	10	4,000
4.0	Committee Meetings		17,000	11	19,400
4.1	Executive	\$5,000			
4.2	Laws and Regs	2,500			
4.3	Specs & Tol	2,500			
4.4	Education	3,500			
4.5	Liaison	2,000			
4.9	Misc	1,500			
5.0	Special Meetings		14,000	12	20,500
5.1	NTEP	4,000			
5.2	OIML	4,000			
5.3	TF on Comm Rqmnts				
5.4	TF on Infor Sys				
5.5	TF on Fraud				
5.6	TF on Motor Fuels				
5.7	TF on Energy	3,000			
5.8	TF (Reserved)	2,000			
5.9	Miscellaneous	1,000			
6.0	Chairman/Chairman Elect		6,000	13	8,500
7.0	Membership Program		6,000	14	5,000
8.0	Printing/Pubs		4,000	15	3,500
9.0	Administration		7,000	16	6,500
10.0	Special Events		5,000	17	5,000
11.0	Promotion		1,200	18	800
12.0	Training Modules		14,000		4,000
12.4	Printing Existing	4,000		19	
12.5	Materials, Module Implementation	10,000		20	
Total Disbursements			\$90,200	21	\$87,200

Footnotes (Income).

1. Account 1.1. The estimate is based on 300 registrations at \$100.00 each = \$30,000. Attendance at the Annual Meeting has remained relatively steady for several years.
2. Account 1.2. No change from previous year. Estimate is based on 1300 members at \$35.00 each = \$45,500. Conference Membership has not varied much in the past few years.



3. Account 1.3. There was an increase in sales of modules due to significant purchases by one state. Otherwise, states continue to reproduce the modules rather than purchase them from the NCWM. An increase in sales is projected based on the fact that more modules will be published during the next 12 months.
4. Account 1.4. No change.
5. Account 1.5. No change.
6. Account 1.6. This account represents the income from the various elective activities of the guest program that are reimbursable.
7. Account 1.9. No change.
8. Total Income. There is a small increase in the budgeted income due primarily to a increase in the estimate of projected sales of Modules.

## Footnotes (Expenses)

9. Account 2.0. An increase based on normal trends in costs of hotels and their services.
10. Account 3.0. No change.
11. Account 4.0. A reduction to reflect experience.
12. Account 5.0. A reduction to reflect experience.
13. Account 6.0. A reduction to reflect experience.
14. Account 7.0. An increase for occasional part-time assistance.
15. Account 8.0. These are the expenses of preparation and printing of NCWM publications (other than the training modules) and for other incidentals such as the NCWM stationery, and for part-time typing assistance. A small increase reflects increasing cost for printing activity.
16. Account 9.0. Expenses for short-term, part-time help, the procurement of supplies for general operations including the post office box, membership dues of the Conference Coordinator in the Society of Meeting Planners, magazine subscriptions, etc. Included in the budgeted amount is \$2,000 for the update of office equipment including acquisition of software.
17. Account 10.0. Offset by Income Account 1.6.
18. Account 11.0. The cost of purchase of promotional items such as ties, tie-tacks, etc.
19. Account 12.4. The cost of printing, assembling and mailing existing training modules that are sold to the public.
20. Account 12.5. A new account; the funds are to be used by the Committee on Education, Administration, and Consumer Affairs for the development of materials for use in imparting teaching skills to state officials conducting training using the NTP Training Modules.
21. Total Expenses. The total of \$90,200 is a small increase over the previous year.

## APPENDIX C

### SITE VISIT TO ALBANY, NEW YORK

The Executive Secretary, working with the Albany County Convention Bureau, visited four properties: the Albany Hilton, Marriott, Desmond Americana, and the Turf Inn. The Hilton is downtown; the other three are within sight of each other in suburban Albany (15 minutes from downtown) along Wolf Rd., which is the newest center of commerce in Albany with shopping malls, office buildings, motels, and restaurants. It is near the Airport. It is not a "walk around" area.

#### THE DESMOND AMERICANA

Pluses: This is a very attractive property, well maintained. Rooms are comfortable and attractively furnished. Restaurants are inviting with a pleasant decor bordering on the elegant. The hotel is built around two central courts designed to give the impression of "Williamsburg" streets: in fact, the two courts are named Fort Orange Square and King Street. The rooms and public areas lining the streets have facades to give the impression of being the outside of homes and shops. One court has an indoor pool and large reception area which would be an attractive location for a large reception. The second court could also be the site of a large reception. A lovely room, "The Lodge," would be inviting for receptions.

Minuses: The restaurants could not handle the sudden influx of 200 for any meal. We would have to make arrangements for catered breakfasts/lunches in the meeting rooms or courtyards.

The meeting space is marginal at best. It is also in three separate areas which would add problems to "management" of the meetings.

#### THE ALBANY HILTON

This is the only property that has given us a proposal.

Pluses: This is an attractive, modern, 4-diamond hotel in a downtown location near the state capitol and the unusual state office complex. Walking around will be enjoyable. There are many restaurants and vendors offering everything from McDonalds to 4-diamond dining. The hotel is a full-service facility. They are anxious to have us. Downtown is slow in the summer, the legislature is gone, as well as the lobbyists.

Minuses: Meeting space would be tight; we might have to arrange for some meetings in the state convention complex a block away. The upkeep of the property is not at the high level of the other hotels.

#### THE ALBANY MARRIOTT

Pluses: This is the newest hotel in Albany. It is very pretty - typical bright rooms and public areas, well maintained, and much in demand.

Minuses: Meeting space is marginal; it would be a tight squeeze. They want to charge for space depending on "food functions." They will not block 250 rooms; perhaps half of members would have to stay at other hotels (Turf Inn, Americana, etc.)

## THE TURF INN

Pluses: There are very large dining rooms and lounges, very large center court for receptions; pool, etc.

Minuses: This is a "bus tour hotel" which explains large service areas (restaurants, court, lounges). The rooms are marginal; a bit haphazard; and meeting space is inadequate.

### ACTIVITIES

There are several attractive options for social activities.

- Trip to Saratoga with dinner in the Club at the racetrack which overlooks the track - one eats while watching the harness races - one can place bets from the table.
- Trip to Lake George with its shops - with a boat ride on the lake including dinner.

**APPENDIX D**  
**REPORT OF THE**  
**TASK FORCE ON COMMODITY REQUIREMENTS**  
**TO THE EXECUTIVE COMMITTEE**

JANUARY, 1987

Summary of Recommendations

The results of the Pilot Study on meat and poultry indicate that the gray area approach can be used to determine compliance of meat and poultry products. The Task Force sincerely appreciates the invaluable assistance of weights and measures inspectors, the Food Safety and Inspection Service (FSIS) of USDA, and the industry in collecting and evaluating the data needed to resolve this long-standing problem.

The gray area approach, as adopted by the Conference in July 1987 for flour, should be extended to meat and poultry products packaged at Federally-inspected plants. Specific recommendations follow.

- (1) When testing meat or poultry products that were packed at Federally-inspected plants, weights and measures officials should use:
  - (a) Category A sampling plans at retail or warehouse locations; or
  - (b) Category B sampling plans or equivalent at the packaging plant.
- (2) Weights and measures officials have several options to determine package net weights:
  - (a) wet tare (the weight of packaging materials and any free-flowing liquid after removing the product),
  - (b) unused dry tare (the weight of unused packaging materials before the product is placed in the package), or
  - (c) dried used tare.
- (3) When unused dry tare is not available at the test site, the methods to dry absorbent tare materials may be employed and the dried tare weight may be used as equivalent to unused tare.
- (4) Unused dry tare or used (but dried or wiped, as appropriate) tare should be employed for bacon, luncheon meats, and fresh sausage.
- (5) When unused dry tare or dried used tare methods are employed, moisture loss has been recognized and corrected for. If an inspection lot fails a Category A test with unused tare or dried used tare, the lot does not comply with net weight requirements, and enforcement action should be taken. The Task Force recommends that the jurisdiction contact both the FSIS Inspector-in-charge and the manufacturer to determine if other information is available on the lot in question that may influence the decision concerning noncompliance.

- (6) If wet tare is employed to determine net weights, the following gray areas should apply:
- o 2 1/2% of the labeled weight for hot dogs or franks (whether meat or poultry); or
  - o 3% of the labeled weight for fresh poultry

**The Executive Committee should recommend these gray areas for wet tare tests.**

- (7) When using wet tare, if packages are found short weight (as compared to the labeled weight) by more than the gray area, then the lot is out of compliance and enforcement action should be taken.
- (8) When using wet tare if packages are found short weight (as compared to the labeled weight), but are within the gray area, the weights and measure agency should contact the FSIS Inspector-in-charge and the manufacturer to determine what data is available on the lot in question. The lot is in or out of compliance depending upon the information available at the plant.
- (9) **The NCWM should adopt specific test procedures embodying the principles enumerated in items (1) through (8) above into Handbook 133 for testing meat and poultry packaged in Federally-inspected plants. (See Appendix E, Laws and Regulations Committee.)**
- (10) Weights and measures agencies should be encouraged to enter into the agreement with USDA Meat and Poultry Inspection by formally signing the "Model Agreement Between a State or Local Government and Food Safety and Inspection Service, USDA". (See Attachment B to this document.)

**The Executive Committee should recommend this Agreement for adoption by the states.**

The Task Force makes the following additional recommendations:

- (1) The NCWM Laws and Regulations Committee should be assigned the responsibility for handling future moisture loss issues, following the gray-area concept as far as possible, because this committee has the responsibility for additions and revisions to Handbook 133. The L&R Committee should work in close collaboration with the Liaison Committee on each request from an industry group for moisture loss recognition. The Liaison Committee should coordinate with appropriate Federal agencies and weights and measures agencies for data collection. A flow chart, presented as part of Attachment D, indicates the process that would normally be followed from identification of the problem to NCWM action.
- (2) The Task Force requests that the committee to which future moisture loss issues are assigned take up the problem of moisture loss in ice-packed bulk poultry from Federally-inspected plants.
- (3) Businesses and industries that are interested in resolving the problem of moisture loss in other packaged product areas should follow the guidelines given in Attachment D.
- (4) The Task Force should be disbanded at the 73rd Annual Meeting.

Attachment A: Report of the November 24 & 25, 1987 Task Force Meeting

Attachment B: Model Agreement Between a State or Local Government and Food Safety and Inspection Service, USDA

**Executive Committee**

**Attachment C: Test Procedures for Meat & Poultry Packaged in Federally-Inspected Plants  
(see Appendix E Report of the Committee on Laws and Regulations for this  
Attachment)**

**Attachment D: Guidelines for NCWM Resolution of Requests for Recognition of Moisture  
Loss in Packaged Products**



ATTACHMENT A  
TASK FORCE ON COMMODITY REQUIREMENTS  
REPORT OF THE NOVEMBER 24 AND 25 MEETING

Policy and procedures for testing packages of flour were adopted at the 72nd Annual Meeting. This policy is based on the "gray-area" concept. (See 71st and 72nd Reports of the NCWM for further discussion.) Additionally, the Task Force reported on its progress in developing test methods for inspecting meat and poultry packaged at Federally-inspected plants. These test methods are also based on the gray-area concept.

The Task Force met November 24 and 25, 1987 to resolve the following remaining issues.

- Determine the size of the gray area for hot dogs and franks.
- Determine the size of the gray area for fresh poultry.
- Develop procedures the NCWM should follow to handle other products subject to moisture loss.

In addition, the Task Force completed its study in other areas.

- Two laboratory intercomparisons (round robins) have been completed for flour moisture determination, with 22 state weights and measures and flour miller laboratories participating. For the American Association of Cereal Chemists, National Check Sample Service results, see Figures 1 and 2.

The standard deviation in moisture content for all laboratories is about 0.1%. These results indicate that moisture content values provided by the miller for flour at the time of pack can generally be relied upon as equivalent to values obtained by weights and measures laboratories. Samples should be exchanged between individual state laboratories and mills on a periodic basis to maintain confidence in equivalent results.

- A letter from Mr. John Taylor, Associate Commissioner for Regulatory Affairs, Food and Drug Administration, was reviewed. Mr. Taylor endorsed the work of the National Conference on Weights and Measures and pledged that his agency would implement NCWM recommendations for flour, and would support future efforts for other products. (See letter, Figure 3)

Meat and Poultry

Many types of meat and poultry products are packaged at Federally-inspected plants.

At the beginning of its work in 1984, the Task Force limited its work by deciding that it would not study the following:



## Executive Committee

- Moisture loss in frozen poultry or water-added hams. These products are packaged at Federally-inspected plants, but the net weights are labeled predominantly at the retail store. The control of net weight is therefore in the hands of the retail establishment.
- Cryovac-packed corned beef. Whether the pickling brine is part of the net weight or part of the tare is now in legal contention, and may be more a matter of definition of the product, rather than a question of moisture lost into the packaging materials.
- Moisture loss of whole, air-dried sausages, for example, pepperoni or hard salami. These products are usually labeled at the retail store. They are subject more to evaporative moisture loss (like flour) than to loss of moisture into the packaging materials.
- Fresh raw meat, which is labeled at the retail store at the present time. Experimental test markets for fresh raw product in consumer-sized packages labeled at Federally-inspected plants are being established; therefore, this type of product may need to be studied in the future.
- Ice-packed bulk poultry or other raw meats shipped from Federally-inspected plants for packaging into consumer sizes at the retail store. This decision was made because the Task Force realized that a large amount of data would have to be collected. The Task Force decided to focus first on consumer-sized packages. The Task Force recommends that the NCWM take up this issue next in its deliberations.

The Task Force focussed its attention on:

- fresh raw poultry products that are packaged and labeled in consumer-sized packages at Federally-inspected plants, and
- processed meat products packaged and labeled in consumer-sized packages at Federally-inspected plants, such as bacon, luncheon meats, fresh sausage, hot dogs, and franks.

Weights and measures inspection at retail or wholesale locations of products that have the net weights labeled at Federally-inspected plants is complicated by several factors.

1. Short weight at retail may be a result of the following:
  - a. Weights and measures inspectors may be using a wet tare weight, as contrasted to the unused dry tare weight used by the packager to determine the net weight of the product.
  - b. Weights and measures inspectors at retail locations do not have access to the unused dry tare that is used by the packager. When dried used tare has been compared with the tare weights printed on the shipping containers, the printed tare weights have not always been found to be accurate.
  - c. Federal inspection and approved net weight plant quality control requires that the net weight of a sample from as much as 8 hours continuous production equal or exceed the labeled net weight. Weights and measures officials at retail test subportions of production lots.
2. When weights and measures officials find short weight at retail, it is difficult to correct the problem at the plant. Discrepancies may result from different definitions of tare and of inspection lot used by the plant and by weights and measures inspectors. There is no formal mechanism to review USDA net weight data taken at the plant on

the lot in question. Potentially, USDA Meat and Poultry Inspection may dispute the validity of net weight test results obtained by weights and measures enforcement officials.

The Task Force has therefore:

1. devised test procedures that eliminate the potential discrepancies between weights and measures results and USDA test results (by using Category A sampling plans and used dried tare, for example);
2. determined the size of the gray area for jurisdictions that use wet tare to test meat and poultry from Federally-inspected plants (2 1/2% for hot dogs and 3% for all fresh poultry); and
3. recommended procedures to resolve and correct other problems at the plant as set forth in the Model Agreement Between a State or Local Government and Food Safety and Inspection Service, USDA.

The procedures are detailed in Attachments B and C. (For Attachment C, see Appendix E of the Laws and Regulations Committee Report.)

In the Report of the 72nd NCWM, 1987, (page 89) the Task Force concluded that:

**BACON:** There should be no free flowing liquid in bacon; therefore, used dry tare would be equivalent to wet tare for these packages.

**FRESH SAUSAGE:** in the Pilot Study, the moisture loss for fresh sausage (the net weight using used dry tare minus the net weight using wet tare) was found to be less than 1/4% for a 1-lb package. This is of the order of magnitude of one scale division on the equal-arm package-checking scale often used by the weights and measures inspector. Therefore, the Task Force recommends allowing no moisture loss. A "wiped" used tare should be used for all net weight determinations.

**LUNCHEON MEATS** Using bologna as the model for this category, the Pilot Study results indicated a moisture loss of less than 1/2% for packages up to 2 months in distribution. Therefore, the Task Force recommends allowing no moisture loss for these products. Tare materials should be carefully wiped and cleaned for all net weight determinations.

#### Franks and Hot Dogs

Preliminary data on only 17 lots collected in the spring of 1987 seemed to indicate a relationship between moisture loss and the elapsed time between date of pack and date of test. Based on their own experience, some hot dog manufacturers questioned these results. Weights and measures officials collected more data on meat and poultry franks in the fall of 1987, and industry also collected moisture loss (free liquid) data. The overall results of the two sets of data agreed:

1. There appears to be no relationship between moisture loss and elapsed time after the first week from the date of packaging.
2. The data is quite scattered; moisture loss may exceed 4 1/2 % (see Figure 4).
3. A maximum moisture loss of 2 1/2% would provide a compliance rate with wet tare comparable to that achieved with dried used tare (approximately 80% compliance rate).

Therefore, the Task Force recommends a gray area of 2 1/2% for wet tare tests of franks and hot dogs.

#### Fresh Poultry

Meat and Poultry Inspection (FSIS) of the USDA, together with members of the National Broiler Council and state weights and measures agencies, collected data on many different types of product at the processing plants of 10 fresh chicken packagers to determine the amount of moisture loss that occurs in the plant from the time the poultry is placed in the package (usually on an absorbent pad) to the time it leaves the plant. The data indicate an industry average of 1.8% moisture loss (data for 6 plants are shown in Figure 5) occurring in the plant. The Task Force did not believe that breaking the broad category of fresh poultry into individual cuts or styles would be workable for field inspection use. The Pilot Study conducted last spring (1987) had found moisture loss of over 5%, including the moisture lost in the plant.

The Task Force recommends that a gray area of 3% be applied to all fresh poultry when using wet tare. This figure will require some overpack by the manufacturer in order to compensate for moisture lost during the manufacturing process but before distribution occurs.

The Task Force expresses its sincerest appreciation for the assistance of all the individuals and organizations involved in this latest data collection effort.

Figure 1

AMERICAN ASSOCIATION OF CEREAL CHEMISTS  
NATIONAL CHECK SAMPLE SERVICE

DATE 6/15/87

IDENT MAC- 1

COL MOISTURE

001	13.010
002	13.080
003	13.070
004	12.870
005	13.150
006	13.000
007	13.060
008	12.900
009	13*270
010	13.140
011	12.990
012	12.800
013	13.050
014	12.920
015	12.850
016	13.000
018	13.100
019	13.050
020	13.100
022	13.170

COUNT 19

MEAN 13.016

LOW 12.800

HIGH 13.170

S.D. .103

AN \* REPLACING THE DECIMAL OF ANY RESULT INDICATES THAT RESULT IS GREATER  
THAN TWO STANDARD DEVIATIONS FROM MEAN AND IS NOT USED IN THE FINAL RESULT.

Figure 2

DATE 7/13/87

AMERICAN ASSOCIATION OF CEREAL CHEMISTS  
NATIONAL CHECK SAMPLE SERVICE

COL MOISTURE

IDENT MAC- 2

001	13.220
002	13.000
003	13.150
004	13.040
005	13.250
006	13.000
007	13.123
008	13.200
009	13.200
010	13.116
011	13.204
012	13.000
013	12.980
014	12.960
015	13.000
016	13.200
019	13.160
020	13.150
022	12*850

COUNT 18

MEAN 13.109

LOW 12.960

HIGH 13.250

S.D. .095

AN \* REPLACING THE DECIMAL OF ANY RESULT INDICATES THAT RESULT IS GREATER  
THAN TWO STANDARD DEVIATIONS FROM MEAN AND IS NOT USED IN THE FINAL RESULT.

Figure 3



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration  
Rockville MD 20857

JUL 16 1987

Mr. Richard L. Thompson  
Weights and Measures  
Department of Agriculture  
50 Harry S. Truman Parkway  
Annapolis, Maryland 21401

Dear Dick:

Since I was the original FDA representative on the National Conference on Weights and Measures (NCWM) Task Force on Commodity Requirements, I have followed its deliberations with interest. I am now informed that the task force has arrived at a recommendation for a net weight procedure on flour, making allowances for weight variations due to moisture loss or gain, which is to be presented for adoption by the NCWM at its annual meeting in July. I further understand that the task force believes the conference will be interested in FDA's attitude toward the recommendation.

You may assure the conference that FDA will initiate appropriate proceedings to adopt those provisions of the task force's recommendation concerning flour that are consistent with our own legal requirements, testing methods, and resources.

You may also assure the conference that FDA is willing to participate in future deliberations for purposes of establishing moisture loss allowances for other foods.

Sincerely yours,

John M. Taylor  
Associate Commissioner  
for Regulatory Affairs



Figure 4

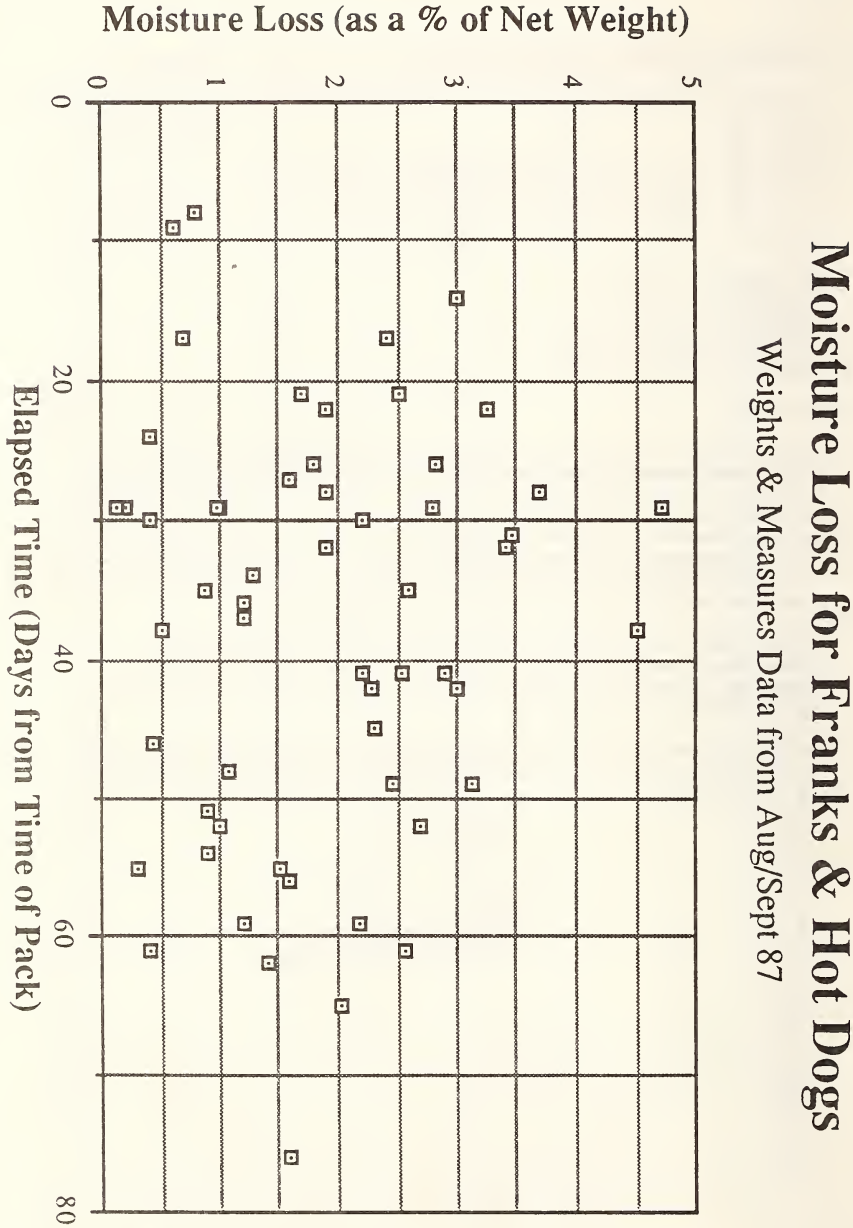
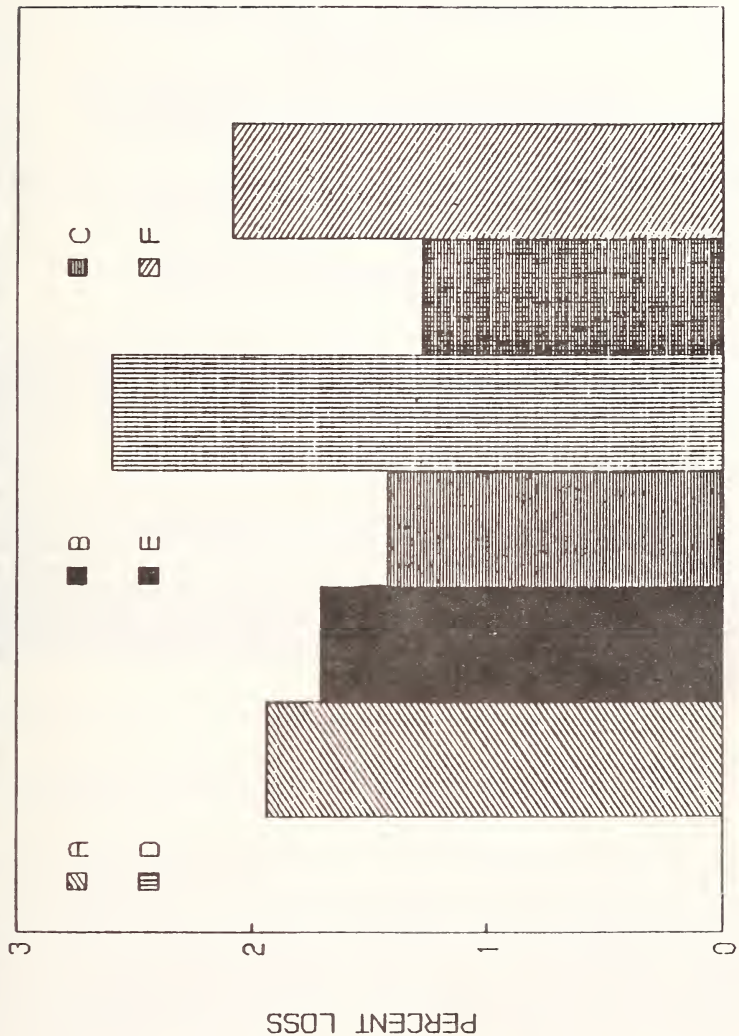


Figure 5

PLANT AVERAGES



ATTACHMENT B

(Changes to Report of the 71st NCWM, 1986, pages 91-101,  
are shown underlined and crossed out, as appropriate.)

MODEL AGREEMENT BETWEEN A STATE OR LOCAL GOVERNMENT AND  
FOOD SAFETY AND INSPECTION SERVICE,  
U.S. DEPARTMENT OF AGRICULTURE

for the determination of net contents of  
federally-inspected meat and poultry products

Preamble to the Memorandum of Understanding

This agreement is between the US Department of Agriculture and the state or local government that has signed the document. Nothing in this document is intended to interfere with the rights of privacy that private businesses now enjoy. This agreement is intended to provide an orderly process for obtaining information by state and local officials from Federal meat and poultry establishments when there is a reasonable need for the information.

MEMORANDUM OF UNDERSTANDING

Between the

FOOD SAFETY AND INSPECTION SERVICE

And the

STATE OF \_\_\_\_\_

Or

LOCAL GOVERNMENT OF \_\_\_\_\_

The Food Safety and Inspection Service and the State or Local Government of \_\_\_\_ hereby jointly agree to the following terms and conditions with respect to the enforcement of certain provisions of the Federal Meat Inspection Act and the Poultry Products Inspection Act and State and local laws regulating net content labeling of meat and poultry products.

I. PURPOSE

To permit full implementation of concurrent jurisdiction, as provided by law, by the Food Safety and Inspection Service (FSIS) and State and local weights and measures agencies engaged in regulatory functions concerning the declared net content of Federally-inspected meat and poultry products. To maximize the exchange of net content information between FSIS and State and local agencies for the determination of label accuracy on Federally-inspected meat and poultry products. To encourage the use of quality control programs by establishments operating under Federal inspection, and to encourage the use of quality control documentation by state and local agencies in their regulatory programs.

II. STATUTES RELATING TO THE AGREEMENT

Nothing in this agreement shall lessen the responsibilities of the Food and Safety and Inspection Service under the Federal Meat Inspection Act or the Poultry Products Inspection Act, nor of the state and local agencies operating under their respective statutes.

- A. The Food Safety and Inspection Service of the U.S. Department of Agriculture is primarily responsible for enforcing the Federal Meat Inspection Act and the Poultry Products Inspection Act. In carrying out its responsibilities, the Food Safety and Inspection Service has inspectors ~~stationed full time in large meat and poultry establishments while one inspector on patrol assignment will be responsible for daily visits to several smaller establishments. who inspect meat and/or poultry processing plants to ensure that products are not adulterated or misbranded. The type and intensity of inspection is determined by criteria defined by the Secretary. In addition, FSIS has compliance personnel that conduct activities primarily outside of the establishment.~~ The sections of the Code of Federal Regulations that concern net content compliance are 9 CFR 317.2(h)(2) for meat and 9 CFR 381.121(c)(6) for poultry. FSIS net content inspection is accomplished by the FSIS inspector in the establishment through observing the establishment's process control and by verifying the product's net contents by

selecting and measuring samples from lots of labeled product. Federally approved quality control programs are establishment-operated control procedures for tare determination, sample selection, sample measuring, recordkeeping, and taking action against noncomplying product. The FSIS inspector monitors the application of the quality control program, evaluates records, and conducts verification sampling and measuring to determine continued Federal acceptance of the establishment's quality control program and the accuracy of its net content labeling on the establishment's product.

- B. For the purpose of preventing the distribution of adulterated or misbranded articles, state and local agencies have concurrent jurisdiction to enforce the provisions of the Federal Meat Inspection Act and the Poultry Products Inspection Act regarding net content labeling of Federally-inspected meat and poultry products within their geographic area, that when those products are located outside of Federally-inspected establishments. In the event that representatives of state or local agencies wish to inspect products in an official Federally-inspected establishment, they may do so with permission of an appropriate FSIS official for that establishment. FSIS permission is not required for state and local agency examination of establishment scales and weighing systems. Also, state and local agencies may impose on such establishments, recordkeeping ~~access~~, and other requirements within the scope of section 202 of the Federal Meat Inspection Act and section 11(b) of the Poultry Products Inspection Act. (See 21 U.S.C. 467 et. seq. and 678). The state and local agencies conduct unannounced evaluations at sites other than at Federally-inspected establishments, of declared net contents on all products including Federally-inspected meat and poultry products. The actions available to the state and local agencies vary depending upon their respective laws. However, typically, state and local agencies may take one or more of the following actions whenever noncompliant products are found: (1) Require noncompliant products to be removed from the market; (2) Relabel to the correct content; (3) Prepare documentation of findings and give it to the owner and/or producer of the product; (4) Contact FSIS if it is Federally-inspected product; and (5) Pursue regulatory action through the administrative or judicial system. (Cite here any additional state appropriate and or local law(s) or regulations if desired deemed appropriate for this MOU).

### III. SUBSTANCE OF AGREEMENT:

#### A. The Food Safety and Inspection Service will:

1. Instruct all its processeding-food inspectors in the procedures that will be used when cooperating with the state or local officials who are reviewing the records or control procedures, and in assisting state or local officials in identifying the establishment personnel responsible for reviewing establishment-maintained records within the framework of this Memorandum of Understanding.
2. Inform the state and local officials who are reviewing the records of the procedures if the establishment is operating under a Federally-approved Total or Partial Quality Control Program.
3. Assist state and local officials by making its records of the evaluation of tare weights and net contents of meat and poultry products at any Federally-inspected establishment available to state and local officials for those lots that they identify as well as any scale records. With respect to any establishment operating under a Federally-approved Quality Control Program, such records will include: the date of the evaluation, the product evaluated, the code markings if any, the label used, the individual product contents in the sample, the range of measurements, the sample average, scale records, and the inspector's signature.



4. ~~Maintain a system for evaluating and verifying tare weights, and will make these records available to state and local officials.~~
54. Be responsible for monitoring the accuracy and suitability of scales in Federally-inspected establishments used to establish the net content of Federally-inspected meat and poultry products. FSIS will require the scales to be maintained in accordance with the requirements set forth in the current latest edition of the National Bureau of Standards Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices" approved by FSIS. This handbook is for sale by the Superintendent of Documents, U.S. Printing Office Washington DC 20408.
65. Maintain its role as exclusive authority for net content of packages at Federally-inspected establishments while cooperating with the state and local authorities.
76. Review the records and its decisions in the event of a disagreement by state and local officials over net contents of Federally-inspected meat and poultry products. The FSIS personnel to settle such disagreements will be the Regional Director of the region in which the Federally-inspected establishment is located. The Inspector in charge at the plant appropriate FSIS official for the establishment will be responsible for arranging an appeal to the Regional Director. The Regional Director or his designee will identify the appropriate FSIS or USDA official for the establishment. In the event agreement is not reached in the regional meeting, the disagreement can be appealed to the Administrator, FSIS.
7. Grant permission to the state or local weights and measures authorities to enter the Federal establishment for any purpose other than the inspection and certification of weighing devices. When the request for entry is to examine a suspect lot, FSIS may decide to conduct its own evaluation on the lot or process in question and, in that case, will issue a report in 10 days. In the event that perishable product is on hold, a response will be provided in two days.
8. Define specific sampling procedures for determining the compliance of a lot of meat or poultry products; ~~at sites other than official meat and poultry establishments. These are defined as Category A Sampling Procedures in the latest edition of National Bureau of Standards Handbook 133 approved by FSIS. At sites that are in the Federally-inspected establishments. These are defined as Category B Sampling Procedures in the latest edition of the National Bureau of Standards Handbook 133 "Checking the Net Contents of Packaged Goods," approved by FSIS, only if the management of the official Federal establishment has authorized the state or local official to sample and test product.~~
9. Define specific sampling procedures for determining the compliance of a lot of meat or poultry product at sites other than Federally-inspected meat and poultry establishments. These are defined as Category A Sampling Procedures in the latest edition of the National Bureau of Standards Handbook 133 approved by FSIS.
910. Agree to support the action of the state or local official if the actions are in agreement with the procedures in this Memorandum of Understanding, including the procedures in Annex A, Appendix E, Laws and Regulations Committee Report, 1988 NCWM Announcement Book, pages 2-73 through



2-83, which summarizes the net weight requirements in 9 CFR part 317 and 9 CFR part 381.

B. States and local agencies will:

1. Instruct their officials to use only those statistical methods defined by FSIS for determining the compliance of a ~~FSIS-inspected and passed production~~ Federally-inspected lot, but examined at the site other than the ~~official~~ Federally-inspected establishment. These are defined as Category A Sampling Procedures in the latest edition of National Bureau of Standards Handbook 133, approved by FSIS. Wet tare or dry tare tests may be used outside the Federal establishment.

- a. If wet tare tests are conducted on products that have an established gray area, the procedures in Appendix E, Laws and Regulations Committee Interim Report, 1988 NCWM Announcement Book, pages 2-73 through 2-83 apply.

- b. If wet tare tests are conducted on products that do not have an established gray area, reasonable variations as permitted in the USDA regulations apply.

~~or Category B Sampling Procedures in the latest edition of National Bureau of Standards Handbook 133 approved by FSIS, for product sampled inside an official Federal establishment.~~

2. Instruct their officials to use only those statistical methods defined by FSIS for determining the compliance for Federally-inspected product samples inside the Federally inspected establishment. These are defined as Category B sampling procedures in the latest edition of National Bureau of Standards Handbook 133 approved by FSIS. Only dry tare tests are to be conducted in the Federally-inspected establishment except for products that are packed in non-nutritious media, in which case the net weight is the drained weight; e.g., vienna sausage.

- ~~2-2.~~ Instruct their officials to take action on lots of products outside of the Federally inspected establishment only if in agreement with the contents of this Memorandum of Understanding, including the procedure in Annex A Appendix E, Laws and Regulations Committee Interim Report, 1988 NCWM Announcement Book, pages 2-73 through 2-83.

3. Instruct its officials when using dry tare and when a lot of a product is out of compliance to proceed with whatever action is appropriate. (However, the weights and measures agency is encouraged to contact the FSIS Inspector in charge at the producing establishment to determine if additional information is available.) When using the wet tare procedure on product outside a Federally inspected establishment and the product (lot) value is within the "no decision area" as defined in Annex A, additional information is required.

This information is to be obtained by contacting the FSIS Inspector in charge at the producing establishment. If the product (lot) value is less than the "no decision area" as defined in Annex A, the state or local official is instructed to proceed with whatever action is appropriate.

4. If they wish to test product at the Federal establishment, instruct their officials to contact the appropriate FSIS Inspector in charge official for that establishment prior to entering the establishment. to determine what

information is available at that establishment, e.g., additional lot information, scale programs, total or partial quality control programs, etc. A current FSIS Directory of official establishments is maintained at the FSIS regional offices as well as the identities of the appropriate FSIS or USDA official for that establishment.

#### REGIONAL DIRECTORS

Western Regional Office  
620 Central Avenue, Bldg. 2C  
Alameda, CA 94501  
(415) 273-7402

Southwestern Regional Office  
1100 Commerce Street  
Dallas, TX 75242  
(214) 767-9116

North Central Regional Office  
607 E. Second Street  
Des Moines, IA 50309  
(515) 284-4042

Southeastern Regional Office  
3718 Peachtree Street, NW  
Atlanta, GA 30309  
(404) 881-3911

Northeastern Regional Office  
1421 Cherry St., 7th Floor  
Philadelphia, PA 19102  
(215) 597-4217

#### STATES OR TERRITORIES

Alaska, Arizona, California,  
Colorado, Hawaii, Idaho, Montana  
Nevada, Oregon, Utah, Washington  
Wyoming, North Dakota, South  
Dakota, Samoa, and Guam

Arkansas, Kansas, Louisiana,  
Missouri, New Mexico, Texas,  
and Oklahoma

Illinois, Indiana, Iowa, Michigan,  
Minnesota, Nebraska, Wisconsin,  
and Ohio

Alabama, Florida, Georgia,  
Kentucky, Mississippi, North  
Carolina, South Carolina,  
Tennessee, West Virginia, Puerto  
Rico, and the Virgin Island

Connecticut, Maine, Maryland,  
Massachusetts, Delaware, New  
Hampshire, New Jersey, New York  
Pennsylvania, Rhode Island,  
Vermont, Virginia, and the  
District of Columbia

5. Instruct their officials, in the event that they wish to visit the establishment for any purpose except for examining, testing, and or certifying scales, to provide to the appropriate FSIS Inspector-in-charge official in writing, a statement of the purpose of the visit. If the purpose is to investigate suspect lots, then the State or local official needs to provide the identification of lots of products that include the sampling, tare, and compliance procedures used for the lots that they believe to be suspect due to low net contents; in addition to providing the plant management with the same information.
6. Optionally, instruct Provide independent authority for their officials to enter a Federally-inspected establishment at least once each calendar year in order to review records of net contents of Federally-inspected products, to examine, test and certify scales and service records for accuracy and suitability. The technical requirements of the scales are as defined by the latest current edition of National Bureau of Standards Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." This handbook is for sale by the Superintendent of Document, U.S. Printing Office, Washington DC 20408, and to discuss results of their review, examinations, and recommendations with FSIS inspection personnel.

Executive Committee

7. Instruct their officials to determine what tare and net content records are needed from FSIS records for the suspect lots. These FSIS records may be copied, distributed, and removed from the establishment.
8. Instruct their officials to ask to review establishment-maintained net content records and to recognize that the information on the establishment operation and the species of the approved Total or Partial Quality Control Program are proprietary information and are not for copying, distribution, or removal from the site without permission of the producer's establishment manager. An establishment that is not operating under an approved net content Quality Control Program is not required to share its net content records with FSIS personnel. Such information may be reviewed, copied, distributed, and removed from the plant site only with the permission of the producer's establishment manager.
9. In those situations where the state or local official and appropriate FSIS ~~official~~ ~~Inspector-in-charge~~ disagree on what action to take, agree to direct the disagreement in writing to the FSIS Regional director in whose region the establishment is located. In the event agreement is not reached in the regional meeting, the disagreement can be appealed to the Administrator, FSIS by the state or local official.

IV. NAME AND ADDRESS OF PARTICIPATING AGENCIES

Food Safety And Inspection Service  
U.S. Department of Agriculture  
14th and Independence Avenue, SW  
Washington, DC 20250

State of \_\_\_\_\_  
or  
Local Government of \_\_\_\_\_

V. LIAISON OFFICERS:

Deputy Administrator  
Meat and Poultry Inspection Technical Services  
Food Safety and Inspection Service

Director \_\_\_\_\_  
Weights and Measures  
\_\_\_\_\_, \_\_\_\_\_

VI. PERIOD OF AGREEMENT:

This Agreement, when accepted by both parties, covers an indefinite period of time and may be modified by mutual consent of both parties or terminated by either party upon thirty (30) days written notice to the other party.

APPROVED AND ACCEPTED  
FOR THE  
FOOD SAFETY AND  
INSPECTION SERVICE

APPROVED AND ACCEPTED  
FOR THE  
STATE OF \_\_\_\_\_  
OR  
LOCAL GOVERNMENT OF  
\_\_\_\_\_

ATTACHMENT C

TEST PROCEDURES FOR MEAT AND POULTRY  
PACKAGED IN FEDERALLY-INSPECTED PLANTS

See Appendix E of the Report of the Committee on Laws and Regulations

ATTACHMENT D  
GUIDELINES FOR  
NCWM RESOLUTION OF REQUESTS FOR  
RECOGNITION OF MOISTURE LOSS IN OTHER PACKAGED PRODUCTS

The Task Force on Commodity Requirements limited its work to only a few product categories, using these categories as models for addressing moisture loss. The gray-area concept is the result of this work.

Recognizing several candidates for future work in moisture loss, the Task Force recommends that the following guidelines for moisture loss be followed as far as possible by any industry requesting consideration:

1. There should be reasonable uniformity in the moisture content of the product category. For example, since pet food has final moisture contents ranging from very moist to very dry, some subcategorization of pet food needs to be defined by industry before NCWM study of the issue.
2. The predominant type of moisture loss (whether into the atmosphere or into the packaging materials) must be specified.
3. Different types of packaging might make it necessary to subcategorize the product. For example, pasta is packaged in cardboard, in polyethylene, or other packaging more impervious to moisture loss. The industry should define the domain of packaging materials to be considered.
4. "Real-world" data is needed on the product as found in the retail marketing chain - not just laboratory moisture-loss data.
5. The industry requesting consideration of moisture loss for its product should collect data on an industry-wide basis (rather than from only one or two companies).

Information concerning the relative fractions of imported and domestically produced product should be available, for example, in order to assess the feasibility of interacting with the manufacturer on specific problem lots.

6. Moisture loss may occur either:
  - during manufacturing; or
  - during distribution.

Data will be needed to show the relative proportion of moisture loss in these different locations, since moisture loss is permitted only under good distribution practices. Geographical and seasonal variations may apply.



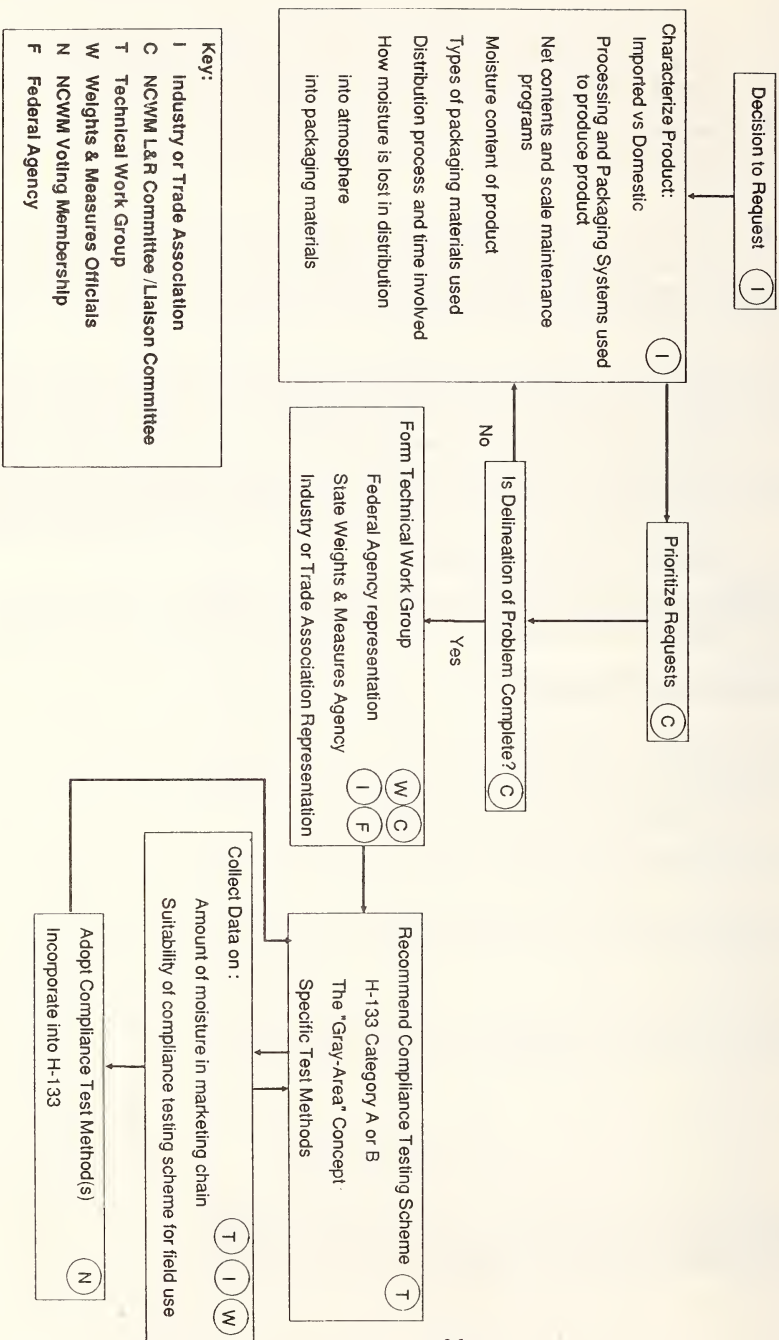
7. A description of the processing and packaging methods in use in the industry will be of great value, as will a description of the distribution system and time for manufacturing and distribution. A description of the existing net quantity control programs in place should be given, together with information on how compliance with Handbook 133 is obtained. A description of maintenance and inspection procedures for the scales should be provided, together with information on suitability of equipment and other measurements under Handbook 44.
8. A description of Federal and local agency jurisdiction and test should be given, as well as any regulatory history with respect to moisture loss and short weight. Has weights and measures enforcement generated the request? What efforts have addressed the moisture loss issue prior to approaching the NCWM? Are the appropriate Federal agencies aware of the industry's request to NCWM?
9. The industry should propose the type of compliance system and/or moisture determination methodology to be used. The compliance scheme, if it contains industry data components, should be susceptible to verification (as examples: USDA net weight tests for meat; or exchange of samples with millers for flour), and should state what the companies will do to provide data to field inspection agencies in an ongoing fashion (as the gray-area approach requires).  
If in-plant testing is to be combined with field testing, who is to do such testing, and how is this to be accomplished? It should be possible to incorporate the proposed testing scheme into NBS Handbook 133, and used with Category A or B sampling plans.

When all the preliminary information recommended above has been collected, a field test of the proposed compliance scheme should be conducted by weights and measures enforcement officials to prove its viability.

See the plan diagrammed on the next page.



# PLAN FOR NCWM RESOLUTION OF INDIVIDUAL REQUESTS FOR RECOGNITION OF MOISTURE LOSS



**APPENDIX E**  
**TASK FORCE ON PREVENTION OF FRAUD**  
**FRAUD SURVEY**

February 17, 1988

**I. Introduction**

The National Conference on Weights and Measures (NCWM) Task Force on Prevention of Fraud was established in the fall of 1986 by then Conference Chairman Frank Nagele. Chairman Nagele asked the Task Force to investigate the ways in which weighing and measuring devices are used to cheat the public, to assess the NCWM's role with regard to the prevention of fraud, and to make recommendations to the Conference as necessary to strengthen the states' effectiveness in preventing fraud.

At the Task Force's first meeting in December of 1986, Chairman Nagele briefed the members on instances of fraud involving retail motor fuel dispensers in Michigan. The Task Force, having learned a great deal from the Michigan experiences, decided that collecting similar information from all of the states would be the first step in accomplishing its mandate. Specifically, the Task Force members believed that a survey could help them identify the nature and scope of fraud related to weighing and measuring devices and the approaches taken by the various states to find and record instances of fraud.

In April 1987, the Survey on Fraud was sent to all state weights and measures directors. The survey was divided into two parts. The first part requested case histories of fraudulent activities involving weighing and measuring equipment that had occurred within the last 3 years. The second part contained questions about the jurisdiction's procedures and policies regarding the detection of fraudulent activities.

The Task Force received 34 responses to the survey from 22 states and the District of Columbia. A total of 29 completed survey forms were returned. The results of the survey are summarized in Section II of this report. The Task Force's findings and recommendations based on the survey are found in Section III.

**II. Summary of Survey Results**

Case Histories

A total of 24 case histories of fraudulent activities were received from 15 survey respondents representing 10 states and the District of Columbia. The number of cases reported is not large considering that it is allegedly the number of cases found in 22 states and the District of Columbia over a 3-year period. However, survey respondents cited several reasons why the information was incomplete:

1. Problems with terminology - One survey respondent said that his jurisdiction does not generally distinguish between fraudulent and nonfraudulent activities because of their understanding that fraud implies intent, and they are not required to prove knowledge or intent. The respondent stated, "It would be difficult for us to prove fraud (intent) in your example of the over-registering retail dispenser with the seal intact. Therefore, we would not call that fraudulent. We would, however, prosecute the owner/agent in this case for not maintaining his devices within tolerances, providing the results of our inspection exceeded our criteria for criminal action."
2. Insufficient data or insufficient resources to compile the data - Several jurisdictions admitted that they did not have the type of information requested; others said they did not have the information readily available and could not spare the staff time required to dig the information out of their files.
3. Similarities between cases - Some similarities between cases caused several states to describe general problems for a number of cases combined rather than citing each case separately.

Although the case studies are limited in number, they provide interesting data summarized below.

Survey respondents were asked to classify case studies by device category. Their responses indicate that over half of the cases involved retail motor-fuel dispensers:

<u>Type of Device</u>	<u>No. of Cases</u>
Retail Motor-Fuel Dispensers	13 (54%)
Scales	7 (29%)
Other*	4 (17%)

\*Propane gas truck, aluminum recycling machine, liquid measuring devices in general, liquefied petroleum gas measuring devices.

These results are not surprising considering that more than two-thirds of the consumer complaints related to weighing and measuring devices that were reported by survey respondents involved retail motor-fuel dispensers (see "Consumer Complaints" section).

Respondents were also asked to classify the type of problem involved in the case according to one of the following:

- D - Device Design - The device was designed in such a way that it led to or facilitated fraudulent activity.
- M - Modification of Device - The device was modified in a way that was not recommended or approved by the manufacturer or the weights and measures jurisdiction.
- U - Use of the Device - The device was used or misused in a way that was never intended by the manufacturer or the user took improper advantage of the tolerances established for the device, the various special features of the device (such as adjustment mechanisms or cash/credit price switches), or the effects of electromagnetic interference on the device.

The results of this classification are as follows:

<u>Classification</u>	<u>No of Cases*</u>
Design	6 (25%)
Modification	5 (21%)
Use	15 (62%)

\*These numbers do not add up to 24 because in one case, which was actually a summary of several cases, all of the categories were listed.

Since the device owner/user is responsible for device modifications as well as improper use of a device, the total number of cases that can be attributed to improper actions by the user is 20, over 80 percent of the total. The small number of cases attributed to device design seems to indicate that the efforts of the NCWM to establish uniform specifications and requirements for weighing and measuring devices and a mechanism for reviewing new devices for compliance with these requirements (namely, the National Type Evaluation Program) have been effective in reducing design-related problems. However, more data are needed to substantiate this conclusion.

The types of fraudulent activities cited in the case studies range from modification of a propane gas delivery truck to allow metered product to be returned to the truck to use of a bathroom scale as a retail device. However, a clear pattern emerged from the analysis of the case studies. In 10 cases, nearly one-half the total, the problem cited involved the illegal adjustment of liquid-measuring devices (primarily retail motor-fuel dispensers), tampering with the security seals on these devices, or both. Complaints involving seals and meter adjustments included the following:

"Individual meters were adjusted to favor gasoline station owners. Security seals had been cut and refastened to each adjusting element to simulate a sealed meter."

"Received a 'Broken Seal Form' as per county policy from maintenance personnel stating that they had removed an official security seal from an adjusting mechanism. When inspection was made, the official security seal was still intact. The measuring chamber had been removed from the device and rebuilt without breaking the security seal."

"(Gas station) maintenance personnel made it their practice to calibrate newly installed pumps to within acceptance tolerance on the minus side. Resultant situation was, in some instances, stations with 20-odd pumps all slightly underpumping."

"The meters have been adjusted by the device owner or repair person, taking advantage of the tolerance limits. The meters may or may not be sealed upon inspection."

"The meter of the dispenser had been adjusted to favor the station owner. All of the pumps had been set at a minus adjustment, but within legal tolerance."

"In the past few years, we have suspected that our State security seals were being used to cover up short measure deliveries. How truck drivers or service technicians obtained our seals is unknown, but we suspect that they were stolen when the inspector's attention was directed."

"This company would break our seals and readjust them from 10-15 percent in their favor. When they knew we were coming, they would adjust them back."

The number of complaints in this area may indicate problems with the design or use of security seals or the design of provisions for sealing.

## Executive Committee

Problems cited involving scales included the following:

- The zero adjustment of an electronic computing scale had been altered so that the operator could manipulate zero balance during a sale.
- A retail scale owner was cited for failing to display the customer side of the scale and for failing to take sufficient tare.
- A motor truck scale owner was cited for using an unsealed device and letting unlicensed persons issue certified weights.
- The manufacturers and dealers of a certain type of retail scale were selling their devices as commercial scales even though they knew the devices could not meet NBS Handbook 44 requirements.

In two cases, aluminum can recycling machines had been modified to cheat the public. In one case, a magnet was used to cause the machine's scale to indicate short weight. In the other case, a piece of metal was placed under the mechanism that deposits the quarters so as to prevent them from falling into the change retrieval pan.

The Task Force asked respondents for brief summaries of cases in order to get an overview of the nature and extent of the fraud problem without taking up a lot of the respondent's time. Naturally, a lot more could be learned by taking an in-depth look at each case and identifying problems found and lessons learned. The Task Force was fortunate to get a detailed briefing on what occurred before, during, and after Michigan's gasoline station fraud investigations. In that one case, there are a number of important findings and conclusions, summarized in Figure 1.

It would not be practical or, perhaps, possible now to get detailed information on past fraud cases. However, if more attention were paid to the documentation and dissemination of cases involving fraud in the future, the Task Force believes that much valuable information could be obtained.

In reviewing the case study data, one other point stands out: over half of the case studies (14) were submitted by local jurisdictions. This seems to indicate that the best information on fraudulent activities may be found at the local level. It is not clear from the survey whether the states are collecting or using this data to administer their enforcement programs.



## Figure 1

## Case Study - Gasoline Station Fraud in Michigan

Background: As a result of numerous consumer complaints and tips from the public, Michigan Weights and Measures became aware of a group of gas stations that were apparently playing "dirty tricks" on customers to increase their profits and steal from honest competitors. Regular inspections of the stations by weights and measures officials failed to reveal problems. Undercover purchases of gasoline by State police were made to determine which stations were actually cheating the public. Based on information gathered during the undercover investigations, Michigan planned a one-day raid on a group of stations. During the raid, a variety of methods and devices designed to cheat the public were found.

Fraudulent Practices Found:

1. Meters were set short during times when weights and measures officials did not normally test -- e.g., after 5 pm and on weekends.
2. A solenoid-valve-operated bypass was used to divert small amounts of metered product back to the storage tank.
3. The cash/credit price switch was used to cheat cash customers -- after they had paid but before they started pumping gas, the price was changed from cash to credit; therefore, they received less product for their money.
4. A gallon (1000 count per unit)/liter (250 count per unit) switch was manipulated to short customers.
5. Electrical wiring was rigged so that each time an intercom in the station was activated, the count on the gas pump increased by .001 to .080 gallon.
6. State seals were counterfeited or a means was found to change meter adjustment without breaking State seals.

Findings/Conclusions:

1. Value of consumer complaints/tips - There was a tendency to not take consumer complaints seriously because regular inspections of the stations cited failed to reveal any problems. When the surprise raid proved that many of the complaints were justified, officials gained a new respect for the value of consumer complaints.
2. Need for undercover investigations/out-of-hours testing - Michigan's investigations indicated that station owners took advantage of the fact that devices were only tested on weekdays during normal work hours.
3. Value of expert witnesses from industry - Industry representatives were able to help Michigan make a case against some owners by providing important technical data on device components.
4. Need for thorough inspections -- not just testing - Many of the problems found during the raid would not have been identified during a routine performance test, but might have been caught during a thorough inspection.



5. Need to look for patterns during investigations, e.g., family connections, unusual purchases - In one case, information from a pump parts store that had just received an order for 300 1/4-inch solenoids, which the store thought might be used in an unapproved way, led to the discovery of solenoid-valve-operated bypasses used to divert metered product back to the pump.

6. Value of cooperation among various government agencies, such as police, immigration - Police and immigration officials (some of the gasoline station owners being investigated were not U.S. citizens) gave valuable assistance to the Weights and Measures officials during the investigations and the raid.

7. Value of consumer education - Many of the dirty tricks found (for example, manipulation of the cash/credit and gallon/liter switches to give customers less product for their money) would not have been effective if the public had been aware of the need to check their purchases carefully. Michigan later prepared news releases to give the public some guidelines on how to make sure they are getting their money's worth when purchasing gasoline. (See Figure 2.)

8. Need for stiffer penalties - Because the owners of high-volume gas stations could make substantial amounts of money through fraudulent activities, the relatively small fines they had to pay when they were caught did not serve as a deterrent. To correct this, Michigan officials amended the state's Weights and Measures Act to provide stiffer penalties.

9. Need for procedures for inspectors who suspect fraud - In one case, a Michigan weights and measures official was doing an inspection at a gasoline station and found some suspicious wiring and switches inside the station. He did not know what action to take; however, because he thought something was wrong, he began taking pictures of the wiring. When investigators later visited the station, they found that the wires had been removed. The owner of the station had apparently been alerted that his scheme had been discovered as a result of the official taking pictures in the station. This situation pointed out a need for procedures for officials to follow when they discovered something that looked suspicious.

10. Need for caution when doing inspections at stations where fraud is suspected - One Michigan official was severely beaten when he attempted to conduct an investigation at a station that was suspected of cheating the public.

11. Need for adequate security seals and proper installation of those seals - Officials found gas pump meters that had been set in favor of the station owner but still had security seals intact.

Figure 2

# NEWS

RECEIVED  
FOOD & DAIRY DIVISION  
1986 JUN 30 PM 5:41  
Contact: Margaret Cook  
(517) 373-1104  
MICHIGAN DEPT. OF AGRICULTURE  
January 30, 1986  
from Michigan Department of Agriculture

FOR IMMEDIATE RELEASE.....

## GASOLINE PURCHASERS OFFERED TIPS WHEN BUYING FUEL

In today's automotive society, the purchase of gasoline has almost become a habit in our daily routine. These transactions are so commonplace, we usually take the accuracy of the weights and measures recorded at the gasoline pump for granted. Yet, carelessness or improper care can occur which may cause inaccuracy in the pump measures. Consumers can protect themselves against inaccurate measures by taking some simple precautions, according to Frank Nagele, Michigan Department of Agriculture (MDA) weights and measures specialist.

Nagele recommends that consumers use the following guidelines when purchasing gasoline:

1. Compare the price on the pump with the advertised price - they should be the same.
2. Be sure the pump meter is clear and is at zero until you begin to pump.
3. Check the price before you begin, then again when the pump starts to run.
4. While pumping your own gas, stop at one gallon, then again at 10 gallons to insure the price is correct when compared to the number of gallons pumped.
5. When self-service islands are closed, prices at mini-service and full-service islands can cost up to 60 cents and more per gallon.
6. Check your auto's gas gauge before and after filling to make sure the new reading corresponds with the amount of gas you purchased. Caution - gasoline gauges and tank sizes are only approximate.
7. Finally, if the pump and the office console indication readings do not agree, the pump governs the correct amount of the sale.

-more-

Communications Division, P.O. Box 30017, Lansing, MI 48909

Practicing these preventive measure can help reduce discrepancies while assuring equity and fairness in the marketplace.

Protecting consumers by verifying and enforcing accurate weights and measures of gasoline station pumps is a responsibility of MDA's Food Division and helps assure the integrity of the state's weights and measures, labeling and advertising laws.

# # #

(1-18-86 JKL)

### Complaint Handling

Consumer complaints are an important source of information on businesses that may be engaged in fraudulent activities; consequently, the Fraud Survey included several questions aimed at determining the types and quantities of complaints received by weights and measures jurisdictions and the types of complaint-handling procedures followed.

According to the survey respondents, the largest number of weights and measures related complaints involved retail motor-fuel dispensers. A total of 6,492 complaints about these devices had been received by survey respondents over the past 3 years. This figure represents 72 percent of all device-related complaints received and 60 percent of the total number of complaints received.

The second highest number of complaints involved packages, both standard and random pack items. A total of 1,781 complaints of this type had been received by survey respondents over the last 3 years, representing 16 percent of all complaints received.

See Table 1 for a complete summary of the responses on numbers and types of complaints.

Table 1

<u>Type of Complaint</u>	<u>No. received in last 3 yrs.</u>	<u>% of Total</u>
Retail Motor-Fuel Dispensers	6,492	60
Packages (both standard and random pack)	1,781	16
Meters (other than motor- fuel dispensers)	865	8
Scales (All)	638	6
- Less than 100-lb capacity	(411)	(4)
- 100-lb capacity and more	(227)	(2)
All Other Devices	1,046	10
Total	10,822*	100

\*This is not the total number of complaints received. One respondent reported that 584 total complaints on devices had been received; however, no breakdown by type of device was given. The 584 device complaints were, therefore, not included in this summary.

Of the 11,406 complaints received by survey respondents over a 3-year period, 2,340, or 21 percent, were found to be valid. A total of 825, or 7 percent, led to fraud investigations. Excluding Michigan, which reported that 700 cases led to investigations, and Los Angeles County, which had a large number of complaints but did not indicate that any of them led to a fraud investigation, only 125 cases, or about 3 percent of all cases, led to investigations. Although even the 3 percent figure represents a significant number of cases that led to fraud investigations, this figure is probably on the low side because some investigations conducted in connection with noncriminal proceedings may not have been counted in the totals (see the earlier discussion on problems with terminology).

Thirteen (42%) of the survey respondents said that they have a formal procedure for handling complaints; 18 respondents (58%) said they have no formal procedure. Ten respondents sent the Task Force copies of their complaint forms and/or procedures (see Appendix B). Most of the forms are

very general in nature; they do not provide for a classification of the complaint according to type of device, although this information could probably be obtained from sections of the forms concerned with the nature of the complaint. An exception is the Kern County, California, form (see Figure 3), which provides a breakdown by type of complaint.

#### Undercover Purchases/Out-of-Hours Testing

The Michigan experience in exposing fraudulent activities involving retail motor-fuel dispensers revealed that some of the problems would never have been identified or confirmed through regular testing procedures. Only by making undercover purchases or testing outside of regular business hours (7 a.m. to 6 p.m. on weekdays) could Michigan officials catch some of the offenders. Consequently, the Task Force thought it would be useful to know how many of the states engage in these practices.

A total of 20 respondents said they make undercover purchases, and 11 respondents said they do not. With respect to after hours testing, 21 respondents said they do such testing; 10 do not. Most (17) of the respondents who indicated that they make undercover purchases also do after hours testing.

Comparing those jurisdictions that make undercover purchases with those that do not, the Task Force found the following:

##### Group A (Make undercover purchases):

<u>Total Complaints</u>	<u>Total Valid</u>	<u>% Valid</u>	<u>Total Complaints that Led to Fraud Investigations</u>
9,814	2,203	22	801

##### Group B (Do not make undercover purchases):

<u>Total Complaints</u>	<u>Total Valid</u>	<u>% Valid</u>	<u>Total Complaints that Led to Fraud Investigations</u>
1,359	137	10	24

Excluding figures for Michigan (which had a much higher number of valid complaints and complaints that led to fraud investigations than any other respondent), the results are as follows:

<u>Total Complaints</u>	<u>Total Valid</u>	<u>% Valid</u>	<u>Total Complaints that Led to Fraud Investigations</u>
Group A - 8,209	1,431	17	101
Group B - 1,359	137	10	24

Figure 3

KERN COUNTY  
DEPARTMENT OF WEIGHTS AND MEASURES  
1116 East California Avenue  
Bakersfield, California 93307  
(805) 861-2418

COMPLAINT REPORT

Priority \_\_\_\_\_

No. \_\_\_\_\_

PROGRAM

☐ Weighing/Measuring Devices    ☐ Quantity Control    ☐ Weighmaster    ☐ Petroleum

DATE REPORTED: \_\_\_\_\_ TIME REPORTED: \_\_\_\_\_ DATE OF OCCURANCE: \_\_\_\_\_ TIME OF OCCURANCE: \_\_\_\_\_

VICTIM'S NAME: \_\_\_\_\_ COMPLAINT AGAINST: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ CITY: \_\_\_\_\_

PHONE: \_\_\_\_\_ PHONE: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ ASSIGNED TO: \_\_\_\_\_ REVIEWED BY: \_\_\_\_\_

REFERRED TO: \_\_\_\_\_

(Department, Agency, Bureau)

☐ SCALES

Type of scale \_\_\_\_\_ Scale # \_\_\_\_\_

☐ METERS

Type of meter \_\_\_\_\_ Meter # \_\_\_\_\_

Fuel grade \_\_\_\_\_ Price/gallon \_\_\_\_\_

☐ VAPOR RECOVERY NOZZLE

Pump # \_\_\_\_\_

☐ leaking ☐ spillage ☐ spitback ☐ other

☐ WEIGHMASTER

☐ Incomplete certificate

☐ Incorrect certificate

☐ Two draft weighing

☐ Other: \_\_\_\_\_

☐ PETROLEUM

Contamination: ☐ Water ☐ Alcohol ☐ Sediment

Pump # \_\_\_\_\_ Grade \_\_\_\_\_

☐ ADVERTISING/LABELING

Sign location \_\_\_\_\_ Pump # \_\_\_\_\_

Details \_\_\_\_\_

REMARKS:

☐ QUANTITY CONTROL

Commodity Purchased \_\_\_\_\_

Advertised Price \_\_\_\_\_ Price Charged \_\_\_\_\_

☐ Weighed at time of sale    ☐ Prepackaged

Commodity in your possession ☐ yes ☐ no

Advertised in newspaper ☐ yes ☐ no

Other: \_\_\_\_\_

☐ SCANNER

Commodity	Advertised	Scanned
_____	\$ _____	\$ _____
_____	_____	_____
_____	_____	_____

☐ FIREWOOD

Price per cord	Amount Ordered
_____	_____

Receipt issued ☐ yes ☐ no

Stacked by dealer ☐ yes ☐ no

Did you measure delivery ☐ yes ☐ no

Ad in newspaper ☐ yes ☐ no

Paid by ☐ check ☐ cash

Other: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Executive Committee

The survey figures indicate that jurisdictions that make undercover purchases have a higher percentage of complaints that are found to be valid and a higher number of complaints that lead to fraud investigations than those that do not. Such practices appear, therefore, to be helpful in confirming suspicions about particular businesses.

### Types of Fraudulent Activities

According to survey respondents, the type of fraudulent activity found most often was operator deceit or carelessness. A total of 14 respondents cited operators as a source of fraudulent activity in an average of 38 percent of the instances of fraud found. Seven respondents said that modified equipment calibration was found in an average of 30 percent of the cases of fraud, and nine respondents said that improper equipment was a factor in an average of 27 percent of the cases. Modified equipment was cited by eight respondents as a problem in an average of 23 percent of the cases of fraudulent activity found, and other types of fraudulent activity were mentioned by six respondents as the problem in an average of 8 percent of the cases.

### Means of Identifying Fraudulent Activities

Asked to identify the means by which they uncovered fraudulent activities, respondents provided the following information:

<u>Means of Identification</u>	<u>No. of Cases</u>
Consumer Complaints	587 - 54% (97 - 27%)*
Undercover Work	479 - 44% (269 - 73%)
Other	20 - 2%

\*The numbers in parentheses are the totals excluding data from Michigan, which had much higher figures than other jurisdictions.

Both consumer complaints and undercover operations were important sources of information on fraudulent activities. A much smaller number of cases were uncovered as a result of other means, including regular device inspections.

### Investigation Procedures

Only seven of the 31 jurisdictions responding said they have formal procedures for conducting fraud investigations. Three of the seven respondents were California counties.

The procedures submitted to the Task Force (see Appendix B) primarily deal with complaint investigations rather than investigations in general.

### Economic Loss

The estimates of economic loss due to fraudulent activities in the last 3 years ranged from \$500 to \$7 million. Most jurisdictions said the amount of loss was unknown. Not enough data were provided to permit any sort of conclusion to be drawn.

### Special Equipment Used in Fraud Investigations

Only six jurisdictions reported having any special equipment that was used in fraud investigations. The main piece of special equipment mentioned was a vehicle with a concealed gasoline tank. See Figure 4 for a complete list of the items cited.

### III. Findings and Recommendations

**Finding 1** - Information on fraudulent activities involving weighing and measuring devices is:

- Incomplete
- Not collected in a uniform manner
- Not centrally collected or analyzed for trends

**Recommendation:** It is recommended that the NCWM Committee on Education, Administration, and Consumer Affairs:

- Develop a uniform definition of fraudulent activities
- Develop a uniform method of classifying types of fraudulent activities that could serve as the basis of state information systems on fraud.
- Establish a mechanism by which information on fraudulent activities could be collected and made available at the national level.

**Finding 2** - The case studies reported to the Task Force indicate that there may be problems with the provisions for or methods of sealing retail motor-fuel dispensers.

**Recommendation:** It is recommended that the NCWM Committee on Specifications and Tolerances make a study of the current methods of sealing devices to determine if changes are required to NBS Handbook 44 or if guidance needs to be provided to the states concerning the best procedures for sealing specific types of devices. The Task Force believes the study should encompass the sealing of all types of devices, not just motor-fuel dispensers.

**Finding 3** - The survey indicates that fraudulent activities were identified by undercover operations and consumer complaints and are primarily associated with the improper use or modification of devices by the operator/owner. Because Handbook 44 now includes a number of requirements aimed at preventing the improper use of devices (see Figure 5 for some examples), the approach to take to reduce fraudulent activities is to focus on the strict enforcement of existing requirements.

**Recommendation:** There is no need for additional general requirements aimed at preventing fraud to be added to Handbook 44 at this time. Each jurisdiction should intensify its efforts in evaluating how a device is used and should develop formal procedures for that purpose.

**Finding 4** - Consumer complaints are an important source of information on fraudulent activities; however, many jurisdictions do not have formal procedures for investigating or resolving complaints or using complaint data to improve their enforcement programs.

**Recommendation:** Each jurisdiction should adopt formal procedures for responding to complaints and should collect and analyze complaint data to identify potential fraud situations.

**Finding 5** - It would have been very difficult, if not impossible, to have confirmed some of the fraudulent practices of device users during routine inspections. This indicates that routine testing of devices is not in itself sufficient to identify fraudulent practices. As noted earlier, the majority of the cases of fraudulent activity reported to the Task Force were identified as a result of consumer complaints or undercover investigations.

**Recommendation:** In addition to having an adequate mechanism for addressing and analyzing consumer complaints as recommended above, jurisdictions should also make use of undercover investigations to follow up on complaints or to check the system periodically to be sure that it is operating properly.

Figure 4

Special Equipment Used In Fraud Investigations

<u>Jurisdiction</u>	<u>Equipment</u>
California, State	Specially equipped passenger vehicles that have traps installed to catch motor oils and gasoline prior to entering the crankcase or fuel tank and unmarked trucks for use in verifying weighmaster transactions, primarily in the area of scrap metal and salvaging.
California, Stanislaus Co.	Undercover car with trap gasoline tank. Camera.
Wisconsin	Ultraviolet lights and marking pens.
Michigan	Vehicles with concealed gasoline tank in the trunk.
New Jersey	Unmarked undercover test car with trap tank. Unmarked undercover quantity control van.
California, Kern County	Portable computing scales with power packs. Percent of alcohol in motor fuel test kits. Undercover vehicle with cold plates.

Figure 5

Examples of NBS Handbook 44 Requirements  
Dealing with Fraud Prevention

Areas Where  
Fraud May Occur

Examples of Applicable H-44 Requirements

Device Manufacture

G-S.2. Facilitation of Fraud

Device Modification

G-S.8. Provision for Sealing Electronic  
Adjustable Components

G-UR.2.1. Installation

G-UR.4.3. Use of Adjustments

Device Use/Abuse

G-UR.1.1. Suitability of Equipment

G-UR.1.2. Environment

G-UR.3.1. Method of Operation

G-UR.3.2. Associated and Nonassociated Equip.

G-UR.3.3. Position of Equipment

G-UR.4.1. Maintenance of Equipment

G-UR.4.5. Security Seal

**Finding 6** - Very few of the jurisdictions responding to the survey said that they have formal procedures for conducting an investigation of fraudulent activity. This is surprising since the process of conducting an investigation that could very possibly lead to a legal proceeding is a delicate one that requires great care.

**Recommendation:** It is recommended that the NCWM Committee on Education, Administration, and Consumer Affairs conduct a study to determine what information (courses, textbooks, articles) exists on the legal aspects of enforcement, such as conducting an investigation, collecting evidence, preparing for a trial, and testifying during a trial. The results of this study should be published and disseminated. The Committee should also consider sponsoring a seminar on the legal aspects of enforcement at an annual meeting of the NCWM, developing a training module on the subject, or including specific information on potentially fraudulent use or modification in each device module.

The Task Force also recommends that the NCWM Committee on Liaison establish a contact with a national district attorneys' organization to initiate an exchange of information and ideas that will facilitate the enforcement of weights and measures regulations.

**Finding 7** - The Michigan gasoline station fraud case study suggests that inadequate penalties for weights and measures violations fail to discourage individuals from indulging in fraudulent activities because the potential gains can far exceed potential losses. The Task Force did not address the question of penalties in its survey; however, it feels that a study of this area could be enlightening.

**Recommendation:** It is recommended that the NCWM Committee on Laws and Regulations conduct a study of current penalties for violations of weights and measures laws and regulations to determine the extent of uniformity among jurisdictions and the opinions of the jurisdictions with regard to the adequacy of these penalties.

**Finding 8** - The process of preventing weights and measures fraud is a complex one, the solution to which requires a multifaceted approach. Drawing upon information obtained from the survey on fraud and the Task Force's own discussions, the comprehensive approach to the prevention of fraud shown in Figure 6 was developed.

**Recommendation:** Jurisdictions should take a multifaceted approach to preventing weights and measures fraud. The comprehensive approach outlined in Figure 6 is recommended.

**Finding 9** - The NCWM, as presently structured, is in a position to carry out the recommendations of this Task Force requiring a centralized effort and to deal with any future national problems involving weights and measures fraud.

**Recommendation:** It is recommended that the NCWM Task Force on Fraud be disbanded and that the work begun by this group be continued by the various NCWM standing committees.

Respectfully submitted,

Steven A. Malone, NE, Chairman  
Ross J. Andersen, NY  
Peter R. Perino, Transducers, Inc.  
Kathleen A. Thuner, San Diego Co., CA  
Richard Tucker, Tokheim Corp.  
Richard L. Whipple, Gilbarco, Inc.

Joan A. Koenig, NBS, Technical Advisor

## **TASK FORCE ON FRAUD**



Figure 6

A Comprehensive Approach to the Prevention of Fraud  
for Weights and Measures Jurisdictions

- I. Adopt Uniform Laws and Regulations Developed by the NCWM
  - A. Be an active participant in the National Conference on Weights and Measures.
  - B. Recommend changes in the uniform laws and regulations when problems are identified.
- II. Adopt the National Type Evaluation Program (NTEP)
  - A. Require Certificates of Conformance for new equipment
  - B. Keep abreast of the latest technology
- III. Train Staff in Accordance with NCWM Training Modules (which are compatible with NBS Handbook 44) and State Laws and Regulations
- IV. Conduct Regular Examinations of Weighing and Measuring Devices in Accordance with NCWM Training Modules
  - A. Require that devices be inspected to determine their compliance with all applicable requirements in H-44 -- not just tested for accuracy
  - B. Do not rely on NTEP approval alone. Remember that only a model of a particular device is tested -- not each device sold
- V. Conduct Special Out-Of-Hours Inspections and Undercover Buying to Test the System
- VI. Maintain a Consumer Complaint Program and Respond Appropriately to Each Complaint
- VII. Educate Consumers on How to Detect Fraud and How to Report Fraudulent Practices
- VIII. Publicize the Activities of the Weights and Measures Office to Put Would-Be Perpetrators of Fraud on Notice and Inform the Public
- IX. Establish Administrative Policies and Procedures for Dealing with Fraudulent Practices and Make Staff Aware of these Procedures
- X. Establish and Maintain a Cooperative Relationship with Local Authorities that Could Be Helpful in Combating Fraud (for example, police, immigration authorities, District Attorney's Office)
- XI. Establish and Maintain a Cooperative Relationship with Industry Groups (device manufacturers, device users, wholesalers, retailers)
- XII. Establish and Maintain Cooperative Relationships with Other Weights and Measures Officials (especially those in neighboring jurisdictions)



## APPENDIX F

### TASK FORCE ON ENERGY ALLOCATION REPORTS

#### MAY 9TH & 10TH MEETING SUMMARY

The Task Force on Energy Allocation held its first meeting on May 9th and 10th, 1988, at the National Bureau of Standards in Gaithersburg, Maryland.

The Task Force established its primary objectives as follows:

- (1) identify the types of energy allocation systems in use and determine how they are used to calculate energy usage;
- (2) evaluate these systems to determine what criteria must be met in order for the systems to provide actual measurements;
- (3) identify agencies having jurisdictional responsibilities regarding such systems;
- (4) identify existing regulations pertaining to such systems;
- (5) develop guidelines for the weights and measures official to follow when dealing with these systems; and
- (6) determine whether it is appropriate for weights and measures to regulate energy allocation issues.

Members of the Task Force contributed information on various types of energy allocation systems currently in use. Members also discussed the various agencies which have authority over such systems in different areas of the United States, and the regulations which apply to these systems.

The Task Force recognizes that additional study of the systems in use in the United States is needed to adequately evaluate the operation of the systems, and to determine whether these systems provide actual measurements of energy usage. It appears that many energy allocation systems use devices to measure only some of the parameters in determining energy usage; the remaining parameters required to calculate energy usage are based on assumptions.

The Task Force decided to solicit additional information from manufacturers and other interested parties by publication of notices in various trade publications.

From the discussions among Task Force members, it is evident that regulatory authority over the use of such systems, and the requirements applicable to these systems, vary widely from state to state. Some states prohibit the use of these systems, and permit only measuring devices for which requirements have been established. In some areas, the Public Service Commission (PSC) (may also be called the Public Utilities Commission (PUC)) regulates the allocation of energy costs; the PSC (or PUC) either prohibits the use of such systems, or rules that this is a landlord/tenant issue. Regional areas may specify ordinances under the authority of a Landlord/Tenant Commission for regulating these systems. Task Force members also indicated that there may be areas of the country which have no such systems in use, or have no regulations to address them.

The Task Force developed a survey to be sent to the state directors. This survey should provide the Task Force with information about the systems actually in use and the difficulties that weights and measures officials encounter, then serve as a basis for developing guidelines for enforcement officials. Since a variety of requirements exists across the country, these guidelines should provide assistance in addressing energy allocation systems under various circumstances.

The Task Force briefly discussed other aspects of energy allocation, including building efficiency, methods of meter reading, and purchase gas adjustment. Task Force members decided that it is appropriate to address these issues only after it has been determined that energy allocation should be addressed by weights and measures officials.

The Task Force plans two meetings during the National Conference on Weights and Measures in Grand Rapids, Michigan in July 1988. The information gathered since the May meeting will be reviewed. Based on the discussion during those meetings, the Task Force will determine whether further study of the energy allocation issue is needed, or whether a recommendation can be made to the National Conference on Weights and Measures for addressing energy allocation systems.

#### JULY 19, 1988 MEETING SUMMARY

The NCWM Task Force on Energy Allocation held a meeting on July 19, 1988 during the National Conference on Weights and Measures in Grand Rapids, Michigan.

The Task Force reviewed its activities since the May 9-10, 1988 meeting in Gaithersburg, Maryland, which included the following:

- 1) A survey on energy allocation systems has been sent to the state directors.
- 2) The results of the surveys received to date have been reviewed and will be summarized when the remainder of the surveys have been received.
- 3) Letters have been sent to the known manufacturers of these systems to request additional information on their products.
- 4) Information received from manufacturers was distributed to various Task Force members for review.
- 5) Task Force members reviewed these systems for validity as measurement systems and presented the information to the other Task Force members.
- 6) Letters were sent to organizations whose members might have an interest in the work of the Task Force requesting additional information and inviting inquiries.
- 7) Letters were sent to the editors of trade publications whose readers might have an interest in the work of the Task Force requesting that a notice be placed in their publications. This would advise readers of the work of the Task Force and request any information that could be provided on such systems.
- 8) Copies of the May 9-10, 1988 meeting summary and a brochure about NCWM were sent to interested individuals, groups, and manufacturers.

Pat Nichols, Task Force chairman, inquired if any members of industry attending the meeting would like to make a presentation to the Task Force about their company's system and/or their position on weights and measures regulation of energy allocation systems.

Roger Freischlag of Energy Billing Systems (EBS) in Colorado expressed an interest in speaking to the Task Force about his company's products and position on the regulation of energy allocation systems. Mr. Freischlag gave a broad overview of the systems that his company manufactures and also made a number of recommendations about requirements which should be established for the use and maintenance of energy allocation systems in general.

Mr. Freischlag indicated that his firm was started in Colorado approximately eight years ago and has installations in 11 states. According to Mr. Freischlag, the Northwest United States seem to be the area where energy allocation systems were first implemented. Although the initial intent of these systems was to lower costs to the landlord, it was later realized that they could make a significant contribution to energy conservation. The building owner's incentive, however, has remained that of allocating the cost of energy to the tenants.

He noted that, with the stabilization of gas prices in the last two years, apartment owners are reluctant to put any type of allocation system into use. This is especially true for buildings which have had a long history of high occupancy and apparent tenant satisfaction. He pointed out that condominium units are an exception since bank funding for these projects frequently require individual meters as a condition of the loan. Mr. Freischlag also stated that a number of their smaller installations (20 to 40 units) have gone "off-line"; that is, the system is still installed, but is not used. He cited the reasons for this as:

- 1) competition for tenants with other multi-unit facilities, and
- 2) administrative work load for billing tenants as too great for the resident manager.

Mr. Freischlag stated that vacancy rate is critical to the building owner. He pointed out, however, that tenant acceptance is the major concern. Lack of tenant approval typically results in dissatisfaction and subsequent relocation.

According to Mr. Freischlag, the question of system accuracy has rarely surfaced in the last eight years. Some typical complaints they have received and their probable causes include the following:

- 1) Tenant is away from the apartment for a period of time and gets billed for hot water that he did not use. This is typically due to the method used by the landlord to divide hot water costs. Many meter the amount of energy required to heat the hot water, and then make a determination of the amount for each apartment. (Comprises 70-80% of the complaints.)
- 2) The total cost of hot water, usually due to high boiler losses associated with side-arm heat exchange. Frequently, the "leftover" costs of energy at the end of the month are added into the tenants' hot water bills.
- 3) High total bill for a given month, often associated with extremes in outside temperatures and poor energy efficiency.
- 4) High bill for heat due to inadequate building maintenance. In addition to building inefficiency, this includes zone valves which become stuck and malfunction of blower motors on fan coil units. In either case, the tenant gets billed for heat which was never received.

Less frequent are the complaints that arise due to pilot light outage. Whenever a pilot light outage occurs in such a system the tenant may potentially be billed for energy not used. Energy Billing Systems takes daily readings on their facilities. Extreme increases in energy usage (which may signify a pilot light outage) are brought to the attention of the building manager so that the pilot light is checked and the tenant's bill adjusted accordingly. He also noted that a bill 10 to 20 % "out of line" is not questioned because even EBS is unable to determine when this degree of inaccuracy exists.

Mr. Freischlag indicated that a system may monitor the presence of the pilot light flame and an open valve prior to the start of the elapsed timer. He is not familiar with companies that produce such a system in any quantity; in his experience, the flame sensor is not usually reliable.

In response to a question about the availability of certifiable meters in the field, Mr. Freischlag responded that some available systems (BTU meters) are actually measuring devices. He pointed out that these devices are seldom encountered in energy allocation applications due to the relatively high cost and low rate of payback of even the lowest priced unit compared with other energy allocation systems. He commented that most landlords consider two years as a cutoff date for payback on the costs of an energy allocation system, while some look for payback within as little as one year to eighteen months.

Based on the experiences of Energy Billing Systems (EBS) Mr. Freischlag made several recommendations to the Task Force concerning the use and administration of energy allocation systems:

**System Maintenance** -- If the owners want to pass the base energy charge or cost of hot water to tenants, some burden should be placed upon the owner to properly maintain the system and to invest in energy conservation.

- 1) The accuracy of the measuring devices which are part of an energy allocation system (for example, the timer and temperature sensor in a time/temperature system) should be checked on a periodic basis.
- 2) The boiler should be equipped with a water temperature modulator control.
- 3) Flu dampers should be installed to increase system efficiency.
- 4) Maintenance of the entire allocation system should be required on a regular basis.

**Methods of Allocation** -- While standards for metering equipment are very important, Mr. Freischlag feels the methods used in allocation are crucial for addressing tenant complaints.

- 1) Hot water should be metered separately.
- 2) Pilot light consumption should be metered.
- 3) Periodic comparisons should be made between the billing periods of the utility company and the results obtained from the allocation system in use.

**Billing Techniques** -- This area is important to provide the tenant with adequate information and to permit addressing problem areas. Standards should be set for billing procedures, including at least the following items.

- 1) Standards should be established for data retention, and records should be maintained for the duration of the billing process.
- 2) The format of the bill is important for tenant understanding. A standard format needs to be developed since it is not now clear which format is most informative to the tenant. EBS, for example, offers a variety of billing formats to the building owner.
- 3) Standard procedures should be established for any system for detecting and handling malfunctions. This should include system operations such as pilot light outages, inoperative zone valves, and blower fan malfunctions.
- 4) A mechanism should be provided for tenants to check their bills and the billing procedure; tenants will, at some point in time, want to ask questions about their bills. There should be procedures to pursue complaints. For



example, for tenant inquiries and complaints, EBS maintains WATTS lines and can provide daily billing summaries upon request.

- 5) In most buildings, inequities in heating efficiency can be produced by "unprotected" apartments (units located on an outside wall or having numerous windows). Rather than attempting to incorporate a factor into the billing process to account for these inequities, EBS recommends that this be adjusted for in the base rent of the unit. This avoids charging the person who does not use much heat for the inefficiency of other apartments.

Mr. Freischlag recognized that most energy allocation systems do not fall into the category of true measurement systems, since most systems utilize measurement devices for only part of the total energy use determination. He pointed out, however, that many systems have been in use for a long period of time, with a low number of complaints and a fairly high rate of tenant acceptance. He feels that, although not true measurement systems, they serve their purpose and fulfill a need.

In his closing comments, Mr. Freischlag expressed the opinion that, if standards or recommendations are developed for energy allocation systems, they should be directed toward new installations. His primary concern is about design limitations for installation.

The Task Force discussed the results of the work accomplished since the May 1988 meeting and the information presented by Mr. Freischlag. The Task Force is of the opinion that most of the energy allocation systems in use do not meet criteria for measurement systems and are unacceptable under weights and measures requirements.

Although energy allocation systems are not acceptable as means of measurement, Task Force members recognize that they fulfill a need and serve a purpose for both landlords and tenants. The relationship between landlord and tenant usually involves a contract and is, therefore, somewhat different from the relationship between a businessman and consumer. As a result of the examination of the systems in use and the regulatory structures which exist in various states, the issue of energy allocation may not be best addressed by weights and measures jurisdictions. The Task Force feels that these systems would be more appropriately regulated by an agency such as a Landlord/Tenant Commission or the Public Service/Utility Commission.

Since the primary function of weights and measures is to ensure equity when the determination of a quantity is involved, the Task Force feels there is an obligation on the part of weights and measures to ensure that an appropriate agency takes responsibility for these systems. Using the information gathered from review of existing systems and from presentations made to the Task Force, the Task Force will develop recommendations to be presented to an appropriate agency. These recommendations will specify criteria which the Task Force feels are necessary for an energy allocation system to adequately serve the landlord and the tenant. They will include landlord and tenant education, tenant billing, recourse for complaints, provision for the detection of system malfunctions, security of system devices, and system maintenance.

Many states do not now have laws specifying the agency or agencies responsible for regulating these systems. It is the intent of the Task Force that weights and measures jurisdictions approach the appropriate agency to discuss these recommendations and to suggest that that agency take responsibility for regulating these systems. Both organizations might consider jointly approaching their state legislature to have definitive language incorporated into law to specify responsibility for these systems. The Task Force will provide guidelines for initiating action.

One of the purposes for forming the Task Force on Energy Allocation was to assist weights and measures jurisdictions in handling complaints received concerning these systems. The Task Force also plans to develop guidelines for weights and measures officials for responding to complaints.

The next meeting of the Task Force on Energy Allocation will be held October 6-7, 1988 at the National Bureau of Standards in Gaithersburg, Maryland.

## APPENDIX G

PROGRAM UPDATE  
OFFICE OF WEIGHTS AND MEASURES (OWM)

The Program of the Office is administered in nine tasks which are described below in the form of tables.

Table 1 - THE NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

Purpose: Sponsor the NCWM as a national forum to assist in the maintenance and improvement of the Conference organization and operations for the solution of weights and measures problems; and to promote the effectiveness and uniformity in State and local weights and measures regulation and enforcement.

- A. Plan, organize, and conduct the Annual Meeting (July), including site selection, program development, speaker coordination, meeting operation, logistical arrangements, and post-meeting evaluation; compile, edit, and arrange publication of Annual Proceedings.
- B. Plan, organize, and conduct the interim meeting (January) and special meetings, including site selection, program development, speaker coordination, meeting operation, logistical arrangements, and post meeting evaluation; compile, edit, and print the Announcement Book.
- C. Develop and propose organizational improvements to increase effectiveness of NCWM committee work and operations; develop and coordinate interactions on the study and resolution of agenda topics between the NCWM and the regional associations.
- D. Operate Secretariat of the NCWM; administer membership program, coordinate interactions with constituencies; manage finances in conformance with policies and within the annual budget; report to Executive and Budget Review Committees.

Table 2 - MEASUREMENT TRACEABILITY

Purpose: Provide technical support for the traceability of state weights and measures laboratories to the national standards through development and use of standard procedures, protocols, measurement assurance programs, and audit the use and care of the physical standards of mass, length, and volume.

- A. Operate program of state laboratory certification; maintain State Laboratory Directory.
  - 1. Administer the state certification program.
  - 2. Promote state participation in regional metrology groups.
  - 3. Develop capability for states to access NBS protocols for performing laboratory calibration including calculations, providing the capability for the states to recalibrate their state standards based on NBS-provided protocols. Plans for oversight of



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laboratory operations to be available to NBS via modem.

4. Gain acceptance of NBS certification of state laboratory capabilities by U.S. Government agencies in lieu of audit by those agencies.
- B. Provide response to questions from and technical guidance to state weights and measures laboratories. Provide consultation and technical advice to states for upgrading capabilities.
  1. Establish generic position descriptions for state metrologists and laboratory personnel. Develop written and/or oral tests for selection of state metrologists.
  2. Develop plan and gain acceptance by states for providing selected measurement services on a regional basis.
  3. Develop software for laboratory calculations and measurement control.
- C. Establish protocols and provide support for operation of Regional Measurement Management Programs (RMMPs), including more documentation and planning for round robin experiments.
- D. Coordinate with NBS Divisions for development and dissemination of design and performance specifications for various standards, for use by the states to upgrade and expand their laboratory capabilities.
  1. Assist in the research effort to investigate meter accuracy as affected by product volatility, flow rate, pressure, temperature, viscosity, and prover design. Revise NBS HB 105-3.
  2. Develop a new NBS HB 105-4 for LP Gas Provers.
- E. Maintain State Metrologists Handbook, including training manuals for the basic and intermediate seminars.

### Table 3 - LAWS AND REGULATIONS

Purpose: Provide the basis for equity-in-trade through the development and adoption of uniform laws and regulations and the development of standards for regulation and inspection of commodity packaging, labeling, and methods of sale.

- A. Provide technical support to and coordination for the NCWM Committee on Laws and Regulations; develop proposed revisions and amendments to the existing recommended laws and regulations (HB 130) in response to new device technology, packaging practices, administrative, legislative, and judicial changes (includes support to States under PL 89-755 and PL 94-168).
- B. Develop automated reference system of state laws and regulations.
- C. Provide advice and guidance to the state governments and the packaging industry on means and methods for achieving the aims of the Fair Packaging and Labeling Act.
- D. Update and revise HB 133 and field handbook based on HB 133. Provide technical advice on statistical sampling and net contents determinations.
- E. Promote adoption of uniform laws and regulations by the states and work with states to update their laws, regulations, and policies to keep current with the actions of the NCWM.

- F. Develop technical methods for inspecting hydroscopic commodities.

**Table 4 - WEIGHING AND MEASURING SYSTEMS**

Purpose: Provide the technical measurement bases for development of uniform performance specifications, tolerances, and test methodology for commercial weighing and measuring devices and systems, and field standards and equipment.

- A. Assist NCWM Specifications and Tolerances Committee and other bodies to develop proposed revisions and amendments to NBS Handbook 44 codes in response to changing technology, such as new electronic systems, vapor recovery, in-motion weighing and computer utilization, and simplify the codes for ease of understanding and use.
- B. Provide technical advice on the design of testing equipment and the development of testing procedures for weighing and measuring devices. Develop type evaluation criteria and test procedures for publication as NCWM Publication 14.
- C. Develop examination procedures in cooperation with API for the testing of loading rack meters.
- D. Promote the design and development of new field standards and test equipment. Develop a reference book of generic specifications for field test equipment such as large weight trucks and trailer-mounted provers for use by states in procurement.
- E. Plan, develop, and provide technical support to state grain moisture meter testing programs.
- F. Update device related handbooks.

**Table 5 - TRAINING**

Purpose: Promote uniformity of weights and measures administration, inspection, enforcement, and laboratory metrology through training and the design and development of training materials.

- A. Plan, develop, and administer development of national weights and measures training program modules for use as the primary state and local weights and measures training resource. Develop and implement plan to fund development and publication of modules on a cost-reimbursable basis.
- B. Annually review existing training modules and make the necessary changes to keep them up to date.
- C. Maintain the National Training Registry and Certification Program. Use the data from these programs to continuously evaluate implementation and success of the existing training program.
- D. Plan and conduct technical training sessions in weights and measures administration for state and local weights and measures officials and members of industry.
- E. Plan and conduct technical training in special areas not addressed by training modules, such as odometers, taximeters, and grain moisture meters.
- F. Develop criteria to assist states in determining who is qualified to teach using the NCWM training modules. Provide training at regional meetings and conferences of state training officers to teach state personnel using the NCWM training modules. Work with NCWM and regional associations to develop train-the-trainer sessions.

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- G. Work with the NCWM to plan for, develop and provide technical support for implementation of inspector certification program and program review.

**Table 6 - TYPE EVALUATION**

Purpose: Evaluate new measurement instruments, systems, and field standards to determine their conformance with standards of design and performance. Provide training of participating laboratory personnel for NTEP evaluation.

- A. Administer National Type Evaluation Program, including support of the NTEP Board of Governors, the Technical Committee on Type Evaluation, and coordination with Participating Laboratories.
1. Establish information system to document decisions and transmit them and Certificates of Conformance to Participating Laboratories and industry.
  2. Improve technical capabilities of OWM staff to make critical decisions related to type evaluation. Hire two new staff members with strong technical backgrounds to support NTEP.
- B. Contribute to the development of criteria and test procedures;
1. Publish NCWM Handbook 14, "NTEP Criteria and Test Procedures."
  2. Document basis for establishment of criteria and test procedures to serve as a reference for those wishing to understand how these decisions were made, and for incorporation into a training program for personnel of Participating Laboratories. Develop a training module for NTEP Participating Laboratories.
  3. Establish a "bulletin board" with the capability for use in development of criteria, test procedures, checklists, and for the subsequent sharing of the information developed with the constituencies, including information on Certificates of Conformance.
- C. Train personnel of Participating Laboratories in protocols and reporting procedures.
- D. Promote state participation in NTEP and reciprocity among state type-approval jurisdictions.
- E. Conduct evaluations of commercial weighing and measuring devices, and field and transfer standards.

**Table 7 - ADMINISTRATION AND SYSTEM DEVELOPMENT**

Purpose: Prepare, maintain, and disseminate information, data, and guidance on weights and measures programs, practices, systems, and units to satisfy needs of the Federal Government, state and local governments, educational institutions, business and industry, and the general public.

- A. Prepare and maintain data bank and provide information services to answer requests for information on weights and measures personnel, jurisdictions, resources, use of data processing systems, legislation, policy and programs.
- B. Work with NCWM to study means to modernize and increase effectiveness of State and local weights and measures programs.

- C. Develop and update Directory of State Programs.
- D. Develop and operate automated Weights and Measures issue file.

**Table 8 - NATIONAL COORDINATION**

Purpose: Provide leadership and coordination among state and local weights and measures officials, and between them and Federal agencies and private sector organizations.

- A. Maintain liaison and coordinate interaction of Federal, state, industry, and professional organizations (e.g., NASDA, USDA, FDA, FTC, ASTM, ANMC, USMB, NCSL, SMA, GPMA, GMA, MIF, API, etc.) in weights and measures activities.
- B. Promote weights and measures principles and techniques through participation at conferences and meetings in both the public and private sectors.
- C. Publish Newsletter, Technical Notes, and Guidelines on weights and measures topics; operate clearinghouse for device and commodity inspection coordination.

**Table 9 - INTERNATIONAL COORDINATION**

Purpose: Provide technical assistance for and coordinate NCWM participation in international legal metrology activities.

- A. Support ADIS work with the International Organization of Legal Metrology (OIML) to improve opportunities for exporting U.S. measuring equipment, influence international adoption of measurement requirements and procedures, and coordinate adoption of OIML recommendations by NCWM and the states and NTEP.
- B. Contribute to development of international standards program for U.S. by working with CODEX, EEC, ISO, etc.
- C. Establish and maintain formal relationship with the Canadian, Mexican, and other Pan-American legal metrology organizations.
- D. Host visitors and cooperate with metrological counterparts in nations worldwide.

### MILESTONES

This section contains the milestones established as a part of the Long Range Plan for FY 88 (October 1, 1987 through September 30, 1988).

- 1. Prepare handbooks through use of "desktop publishing."

Prepare 1989 editions of NBS handbooks 44, 130, and the Proceedings of the 73rd Annual Meeting using the OWM desktop publishing capabilities.

Conversion to the use of desktop publishing will result in improved quality and afford more flexibility for the use of graphics notations.

- 2. Publish NTEP criteria and test procedures as NCWM Publication #14.

Incorporate previously used NTEP criteria and procedures with criteria recently adopted by NCWM and publish.



## Executive Committee

Publication will establish national standards for the operation of the National Type Evaluation Program.

### 3. Publish the third edition of NBS Handbook 133.

Update and publish NBS Handbook 133, "Checking Net Contents of Packaged Goods" to include new standards for regulation of meat and poultry products, flour, and borax.

Publication of the third edition will bring the handbook current with the actions of the National Conference on Weights and Measures and the needs of the regulators and the industry.

### 4. Grain moisture meter test procedure intercomparison.

Conduct intercomparison of Handbook 44 test procedures for grain moisture meters with procedures of the USDA Federal Grain Inspection Service.

Results of intercomparison will be the basis for the establishment of uniform national standards.

### 5. Develop test procedures for loading rack meters.

Develop test procedures for regulation of loading rack meters in coordination with the American Petroleum Institute.

The result of this work will be a national standard used by the states and industry.

### 6. Establish volumetric round robin.

Establish round robin among the state regional measurement assurance associations using a 100-gallon prover.

The round robin will be the basis for improving the ability of state laboratories to provide large volumetric calibration services to their inspectors and industry.

### 7. Computerize the administration of the National Type Evaluation Program.

Automate the management of the National Type Evaluation Program including the development of test criteria and procedures, and the preparation and review of Certificates of Conformance using the NCWM Bulletin Board.

Automation will decrease the response and turn-around times to the industry and improve the effectiveness of the resources applied to this work.

### 8. Establish a Weights and Measures Issues File.

Design and establish a prototype issues file to serve as a single source of weights and measures issues for the work of the committees of the National Conference, the four regional associations, state associations, and industry associations.

System will be structured for easy access via computer modem providing immediate access for all interested parties to latest status of the issues. The system will increase the effectiveness of addressing the issues.

### 9. Training module on NBS Handbook 44.

Complete the first draft of and field test the training module for Introduction to NBS Handbook 44, "Specifications, Tolerances, and other Technical requirements for Weighing and Measuring Devices".

The Module will provide material for use in training weights and measures officials on the content, history of development, principles, and interpretation of the national requirements for regulation of weighing and measuring devices.



## **APPENDIX H - PART I**

### **MEETING SUMMARY**

Technical Committee on National Type Evaluation  
Weighing Industry Sector  
October 28-29, 1987

and the

NTEP Board of Governors' Meeting  
October 30, 1987

The members of the NTEP Board of Governors attended the Technical Committee meeting to hear discussions of issues to be decided at their meeting. The decisions of both the Technical Committee and the Board of Governors are reported together under each subject heading.

See the end of the Report for a list of attendees.

#### **I. Review of Technical Policy and Test Procedures for Load Cells**

The Technical Committee discussed the NTEP load cell policy and test procedures mailed September 22, 1987. The following changes or corrections were made and have been incorporated into the draft of NCWM Publication No. 14:

1. Page 5, line 4, the "0.3" was changed to "one-third."
2. Page 5, the second to the last paragraph was deleted.
3. Page 7, a criterion was added under "Load Cells to be Submitted for Test" to the effect that, if metals of significantly different metrological characteristics are used for load cells within a family, then data must be submitted for load cells made of each different metal. (See Item XI.)
4. Page 9, a line was added to identify the direction of loading the load cell, i.e., tension, compression, or both. The last sentence of the load cell application form was changed to read, "Please include drawings of the family of cells and authorize payment for the costs involved."
5. As a result of discussions later in the meeting, the Section VIII "Tolerances for Multiple Load Cell Applications is replaced with the following (as amended by the Office of Weights and Measures to generalize the application to the scale verification scale division of e).

scale tolerance for tests to determine load cell error, repeatability error, the temperature effect on minimum dead load output, and creep.

The value(s) of the minimum verification scale division for the load cell shall be marked on the load cell or contained in an accompanying document. These load cells may be used in multiple load cell applications wherever

$$v_{\min} \leq \frac{e}{\sqrt{N}}$$

where  $v_{\min}$  = minimum verification division for the load cell  
 $e$  = the value of the verification scale division for the scale  
 $N$  = the number of load cells in the scale.

The Board of Governors adopted the recommendation.

6. A paragraph was added in NCWM Publication No. 14, page 158, under "Marking Requirements" stating that a manufacturer may market load cells as part of the same family with fewer scale divisions and larger  $v_{\min}$  values than the cells evaluated by NTEP without requiring an additional type evaluation. However, each load cell must be marked with the appropriate  $n$  and  $v_{\min}$ .

Since data for load cells will be submitted up to and after January 1, 1988, and the Certificates of Conformance for some load cells will not be issued until after January 1, 1988, manufacturers are to mark these load cells with the anticipated values for which a Certificate will be issued in order to comply with the Scales Code paragraph S.6.10. Manufacturers must have submitted load cell test data by December 31, 1987, or they are subject to having their load cells rejected by weights and measures officials after January 1, 1988, as not demonstrating compliance with NBS Handbook 44. Weights and measures officials should be aware that load cells used in relatively small capacity scales (less than 2000-lb capacity) may not have been tested separately and are not required to be marked under S.6.10. (See Item X.)

7. The table in NCWM Publication No. 14, page 162, Section O-4, listing the maximum times for placing weight on a load cell is to be applied to the creep test.

## II. Number of Load Cells to be Tested

The Technical Committee discussed whether or not the number of load cells that must be tested before the multiple load cell tolerances apply, should be decreased from two to one. The reasons given to support the reduction were that the test of two cells is not statistically significant and testing two cells is costly. Reasons given for keeping the requirement at two cells is that the two-cell approach was a compromise from four or more cells to be tested to provide a better statistical base and the manufacturer must test load cells regularly, so the information should be available at relatively low additional cost.

It was concluded that load cells evaluated for single load cell applications and marked with an "S" as required by Scale Code paragraph S.6.10., may be used for multiple load cell applications provided the number of scale divisions,  $n$ , and the  $v_{\min}$  values are the same as the single load cell applications. If a manufacturer wishes to have data for a load cell evaluated for single cell applications for which the tolerance is 0.7 times the scale tolerance, and use the cell for multiple cell applications limited to the single cell  $n$  and  $v_{\min}$  values, then only one load cell must be submitted for type evaluation. If the number of scale divisions or the  $v_{\min}$  values differ, then two load cells must be submitted for evaluation.

## Executive Committee

The Technical Committee voted 8 to 6 in support of requiring only one load cell to be tested for multiple load cell tolerances.

**The Board of Governors voted to continue the policy of requiring two load cells to be tested for multiple load cell tolerances and recommended that the Technical Committee address this issue again at its next meeting.**

Unless the Technical Committee can develop a consensus on this issue, the Board is unwilling to change current policy.

### III. System Upgrade of Load Cells

The Board of Governors was requested to review the NTEP policy that requires a complete type evaluation on a system that upgrades the accuracy class of a load cell or increases the number of scale divisions for the load cell above the number for which the load cell has received a Certificate of Conformance. A "system" normally consists of a load cell and an indicating element. The indicating element typically corrects the nonlinearity of a load cell to provide more linear scale output.

Reasons given to eliminate the required type evaluation were:

1. There have been instances where weighing elements using load cells having a Certificate of Conformance for a given  $n$  and  $v_{min}$  did not pass the influence factors tests for type evaluation for the same  $n$  and  $v_{min}$ . Additionally, production load cells were not available to scale manufacturers in sufficient numbers to allow them to produce scales complying with Handbook 44.
2. NTEP did not have the resources to respond to the additional work load resulting from this type evaluation policy.
3. Because indicating elements can upgrade the performance of load cells, the final scale system might have more scale divisions than the number of scale divisions for which the load cell was evaluated separately.

Reasons given to maintain the existing policy were:

1. The indicating elements typically correct only for nonlinearity at a single temperature and do not correct for the temperature characteristics of the load cells.
2. The metrological characteristics of such a system would be different and the tolerances would be more stringent due to the larger number of scale divisions. Consequently, the system must be tested to determine compliance with the influence factors requirements.
3. Load cells are available to meet Class III L applications up to 10,000 scale divisions, so scale manufacturers have a source of load cells to meet production needs.

**The Board of Governors concluded that if a system "upgrades" a load cell above the accuracy class or the number of scale divisions for which the load cell has been separately tested, then the system must go through a complete type evaluation. For scale conversions from weighbeam or dial indicators to a digital indicator with a load cell, the "modified portion" of the scale (that is, the load cell and indicator) must be tested together and must meet the new requirements. The indicating element and load cell must go through the temperature tests simultaneously and the tolerance is 0.7 times the tolerance for a complete scale.**

OWM Decision Following the Meeting:

The manufacturer of a system that "upgrades" a load cell, must specify how the device is to be repaired in the event that one component requires replacement. Since the indicator and load cell may have been matched in performance, and the matching may have been done based upon laboratory tests, it may be that both components of the system must be replaced in the event that one fails in the field. If the manufacturer has a method for assuring that the replacement of only one part will result in continued system compliance with the influence factors requirements, then the manufacturer must specify the method to be used to assure compliance.

**IV. Compliance of Production Devices**

Since compliance with the influence factors cannot be tested in a practical manner in the field, the issue of assuring the compliance of production devices was discussed. The issue of compliance was expanded to cover scales and other devices and whether or not production devices are consistent with the original design submitted for type evaluation.

The Board concluded that:

1. the existing NCWM policies are sufficient,
2. NTEP is limited to the initial type evaluation of devices,
3. the field enforcement process is responsible for assuring that production devices comply with Handbook 44, and
4. if the field verification process reveals a history of abnormally high device failure, this information may be used in withdrawing a Certificate of Conformance for cause.

NTEP will investigate complaints as necessary; however, NTEP will not monitor the compliance of production devices nor assess the effectiveness of the quality control programs operated by manufacturers. Complaints may be registered by weights and measures enforcement officials or industry representatives. A manufacturer is responsible for protecting his own interests by ensuring that serial production units are the same as the original design.

**V. Repair and Replacement of Scale Parts**

The 1986 revision of the Scales Code introduced several new requirements, including influence factors, that were phased in beginning January 1, 1986. Paragraph T.N.8. required that all new types of scales submitted for type evaluation after January 1, 1986 had to meet the requirements at that time. Device models that had been evaluated prior to January 1, 1986 had to comply by January 1, 1988 with the influence factors requirements if the device was to be manufactured after January 1, 1988. A uniform policy had to be established for addressing the repair and replacement of parts for devices installed in the field.

The Board of Governors established the following guidelines.

1. If a scale had a type evaluation before 1986 and the load cells were not tested for compliance with the 1986 (or later) H-44 requirements, then the load cells in the scale may be replaced with load cells that have not been tested for compliance with the 1986 (or later) H-44 requirements. Consequently, scale and load cell manufacturers may use equipment that has not been evaluated for compliance with the influence factors requirements as replacement parts for scales approved prior to 1986 and manufactured prior



to 1988.

2. If a load cell is placed in a steelyard rod and a digital indicator is installed after January 1, 1988, this is a modification of the original type and the modified scale with the digital indicator must meet the 1986 (or later) H-44 requirements because the scale will be marked with an accuracy class. However, if the previous weighbeam or dial indicator is retained as a back-up indicator, the back-up indicator remains as an unmarked scale.
3. If a scale has load cells that meet the 1986 (or later) H-44 requirements, then the replacement load cells must meet the 1986 (or later) H-44 requirements.
4. All load cells used in scales manufactured after January 1, 1988 must meet the 1986 (or later) H-44 requirements.

#### **VI. Repair or Remanufacture of Load Cells**

The issue of the effect and quality of repairs on load cells that have been evaluated under NTEP was discussed at length. The weighing issues were broader than load cells alone. For example, the repair of digital indicators may affect compliance with the influence factors requirements. The remanufacture of equipment can also affect the performance of metering devices. Remanufactured devices must comply with type evaluation requirements. This includes identification of the remanufactured device as different from that originally manufactured, removing the original manufacturer's nameplate and applying the nameplate of the remanufacturer.

Any repair of a load cell may affect compliance with the influence factors requirements, and the issue of repair is not limited to load cells.

**The Board of Governors established the policy that:**

1. The original Certificate of Conformance is no longer applicable to a repaired device if that device, or component of that device, is
  - a. susceptible to influence factors, and
  - b. is repaired by other than the original manufacturer or its authorized repair agent.
2. The weights and measures jurisdiction has the authority and responsibility to ensure that the device complies with T.N.8. by requiring either an NTEP evaluation or the jurisdiction's own evaluation.

The SMA Load Cell Repair Task Force has initiated a proposal to the Specifications and Tolerances Committee that would add a marking requirement to Handbook 44. The proposal would require that repaired load cells be marked with the identification of the repairer (if other than the original manufacturer) and the date of repair.

#### **VII. Repeatability of Load Cell Test Data**

The Technical Committee concluded that all individual data points (not just the average of the test run) must be within tolerance before a Certificate of Conformance can be issued. This requirement makes the repeatability requirement (T.N.5.) irrelevant when evaluating load cell test data.

When rounding values for individual test data points, the data should be truncated to two decimal

places in verification scale divisions,  $v$ .

If load cells may be used in both tension and compression, complete data sets must be submitted for each direction of loading.

#### VIII. Tolerances for Multiple Load Cell Applications, Class III and IIIL (Superseded; see Item 1, paragraph 5 of this Report)

Random errors cancel when load cells are used in multiple load cell applications. Although an earlier decision established the technical policy of allowing a 1.0 multiplier of the scale tolerance for load cell and repeatability error, the method of determining the appropriateness of  $v_{min}$  for multiple cell applications was reviewed.

The  $v_{min}$  of a load cell is primarily affected by the temperature effect on the minimum dead load output of a load cell. In the case of class IIIL load cells, the repeatability on the return to zero may also limit  $v_{min}$ . Although the distribution of load cells with respect to the temperature effect on minimum dead load output may not be a normal distribution, statistically random errors still cancel when multiple load cells are used.

The Technical Committee concluded, and the Board of Governors endorsed, the policy that:

1. the load cell tolerance for the temperature effect on the minimum dead load output shall be 0.7 times the tolerance for a complete scale for single cell applications and 1.0 times the tolerance for a complete scale for multiple load cell applications;
2. if the values for  $v_{min}$  are different for single and multiple cell applications, then the load cells shall be marked with the  $v_{min}$  values applicable to both single and multiple load cell applications;
3. load cells evaluated for single-cell applications are appropriate for use in multiple load cell applications provided that the value for  $v_{min}$  is less than or equal to the scale division divided by the square root of the number of load cells in the scale in which the load cells are used.

It is the responsibility of enforcement officials to verify that the load cells used in a scale are appropriate for the application.

As a result of the decision by the Board of Governors, the technical policy reported under item I, point 5 will become part of the NTEP policy applicable to load cells used in multiple load cell applications.

#### IX. Tests for the Temperature Effect on Minimum Dead Load Output (MDLO)

An extensive discussion occurred regarding method of test to determine the temperature effect on the minimum dead load output of a load cell. OIML International Recommendation 60 states that the temperature effect on the MDLO is to be determined by the results obtained from the tests to determine load cell error over a range of temperatures. However, as part of a larger item adopted at the June, 1987 meeting of the Technical Committee, an alternate test procedure was accepted that allowed a separate temperature cycle test to be conducted. Normally the separate test results in a small  $v_{min}$  to be applied to the load cell because fewer variables affect the test results, the scale not being under a load. Although this procedure provides a direct measure of the temperature effect on MDLO without contributions of error from other sources, it does not reflect the actual method of use of the load cells.



## Executive Committee

The Technical Committee voted 8 to 5 to require that the temperature effect on MDLO be determined from the temperature tests to determine load cell error. The Board of Governors voted 4 to 3 to support the recommendation of the Technical Committee to allow only the one test to be used to determine the temperature effect on the MDLO. As a result of this decision, load cell manufacturers are to compute the values for  $v_{min}$  based upon the temperature effect on MDLO as determined in the temperature tests to determine load cell error, not from a separate temperature test with no load on the load cell.

NTEP will accept the test data collected between June and November 1987, based upon the separate test, but will not accept the data for tests run after the October 1987 meeting.

Due to lack of consensus on this item, the Board requests the Technical Committee to address this issue at its next meeting. Interested parties are encouraged to submit written position papers and supporting test data to provide a basis for further discussion.

### X. NTEP Certificates Applicable to Lesser Grade Load Cells

The Technical Committee agreed that a load cell manufacturer may market load cells in the same family with fewer scale divisions and  $v_{min}$  values greater than the load cells submitted for type evaluation. However, the load cells must be marked with the appropriate maximum  $n$  and the  $v_{min}$  for which the load cell may be used. This enables marginal units resulting from the production process to be moved to an appropriate lesser grade without the need for a separate type evaluation. For example, a class III load cell may be marked for use up to  $n=2000$  when the Certificate of Conformance states that the load cell family has been evaluated for class III and  $n=3000$ . This load cell would have to be marked with  $n=2000$  so that the appropriate use of the load cell can be determined and verified.

### XI. Load Cells Made of Different Metals

A load cell manufacturer may use different basic metals (e.g., stainless steel, carbon steel, aluminum, beryllium copper) within a family of load cells, which can result in significantly different metrological characteristics for the load cells. The manufacturer must therefore submit test data for each different basic metal used in the load cells, and receive certification for each subgroup of load cells within the family of load cells.

### XII. Marking of Weighing Elements

Additional marking requirements were adopted in 1987 for weighing elements not permanently attached to indicating elements (S.6.8.). To clarify which weighing elements have to carry this marking, the Technical Committee concluded that whenever weighing and indicating elements can be "mixed and matched", they should be considered not permanent. This definition means that dials and weighbeams are considered not permanently attached to the weighing element. When a weighing element and indicating element share a common enclosure or housing, then the two are permanently attached. The marking of the load cells does not satisfy S.6.8. as the marking of the weighing element.

#### OWM Decision Following the Meeting:

It is recommended that the minimum verification scale division be marked on the weighing element using the notation  $e_{min}$ . This will distinguish the marking from the  $v_{min}$  marked on the load cell. If the weighing element is marked with a scale division in conjunction with the capacity statement, e.g., 30 x 0.01 lb, then  $e_{min}$  will be assumed to be 0.01 lb and no additional marking is required.

### XIII. Marking of Indicating Elements

Marking requirements for indicating elements not permanently attached to weighing elements were adopted in 1987. These indicating elements must be marked with the accuracy class and the maximum number of scale divisions for which the indicating element complies with the applicable Handbook 44 requirements.

The scope of this marking requirement was clarified to provide a better understanding of the requirement. As a practical matter, it was concluded that only the primary indicating element has to carry this marking; additional slave indicating elements do not have to be marked. However, this means that a remote indicator on a scale, such as point-of-sale scale with one slave indicator (one without any "intelligence"), still must be marked with the maximum number of scale divisions. Similarly, a video monitor used as an indicating element also has to be marked to comply with S.6.9. if it is the primary indicator.

### XIV. Pre-NTEP Approved Devices

Many mechanical devices that have not been evaluated by NTEP have been manufactured for many years and are not affected by the influence factors. The NTEP Administrative Policy and Procedures has a provision under which Certificates of Conformance may be issued based upon evaluations performed by other type evaluation jurisdictions. Several manufacturers have submitted requests for NTEP Certificate of Conformance for a relatively large number of devices based upon the evaluations performed by pre-NTEP state programs.

The Board of Governors established the following policy:

1. Provisional Certificates of Conformance will be issued for those devices that are not affected by the influence factors and satisfy the NTEP requirements, issuing the Certificate based upon the evaluation by another jurisdiction.
2. Manufacturers of these devices must request that a Certificate of Conformance be issued and provide copies of the certificates of approval.
3. If NTEP determines that adequate testing was performed and the device has not been modified from the original device design, then a provisional certificate will be issued.
4. The certificates will be distributed to the states. Weights and measures officials will be asked to report whether or not their experience indicates that the devices comply with Handbook 44 and whether or not the states have any objection to the issuance of the Certificate of Conformance. Any objections will be reviewed by the Board.
5. If the responses from the states are favorable, then a full Certificate of Conformance may be issued for the device.

### XV. Definition of Weighing Element

The Technical Committee did not provide a consensus view on the definition of terms for Handbook 44. Terry James expressed the view that the distinctions between the load receiving element, the weighing element, and the indicating element are needed. Ross Andersen, on behalf of the New York Weights and Measures Bureau, has submitted to the Specifications and Tolerances Committee an extensive revision of terms to be considered for the Scales Code. This information will be reviewed at the Interim Meeting in January.

#### **XVI. Model Designations for Modified Equipment**

G-S.1. Identification requires that weighing and measuring equipment be marked with a model designation that positively identifies its pattern or design. Many scales manufactured after January 1, 1988 will have to be modified to meet the influence factors requirements.

The Board of Governors adopted the following policy

1. Any device modified to meet the influence factors requirements must carry a model designation that is different from the previous model.
2. This differentiation may simply be a prefix or suffix to the original model designation.
3. The device may still carry the same model series designation on the device, but the model designation on the identification badge must be unique.

#### **XVII. Manual Gross Weight Entry Capability**

Some scales and printers with the capability of manually entering gross weight values have been submitted for type evaluation. The NTEP has rejected this feature on the basis that it facilitates the perpetration of fraud. To clearly indicate that this capability is unacceptable, the Specifications and Tolerances Committee will be asked to add a provision to Handbook 44 that specifically prohibits the manual entry of gross weight values.

#### **XVIII. Marking of Scale Capacity by Scale Division**

Scales Code paragraphs S.6.2. and S.6.3. require that the scale capacity by division be marked adjacent to the weight display. The Technical Committee discussed the requirement to see if additional guidance could be provided for application in type evaluation. It was concluded that specific guidelines could not be given. Judgment will have to be used by the evaluating officials to determine what constitutes a satisfactory location, type, size, and conspicuousness for the capacity by scale division marking.

#### **XIX. Weight Unit Symbols**

The symbols that have been allowed for weight units are those specified in Table 1 of G-S.5.6.1. and in Section 1.13. (General Tables of Weights and Measures) of Handbook 44. (One exception is that the abbreviation for carat is "ct".) As a result of the discussions, it was concluded that NTEP will accept the abbreviation of "TN" or "tn" (upper or lower case but not mixed) for the short ton. It was felt that these abbreviations are frequently used and generally understood by those using the weight unit of ton.

#### **XX. Key Markings and Symbols**

The adequacy of key markings and the lack of uniformity in the symbols used for key markings was reviewed. Although some key markings are confusing, it was concluded that Handbook 44 requires only that keys be marked and, if they are visible only to the operator, understood by the operator after training. NTEP will continue to use judgement regarding symbol utilization on controls until such time as standardization work by OIML and others is completed and adopted by the NCWM. The Technical Committee suggests that the Specifications and Tolerances Committee review the marking issue to determine if additional action should be taken.

## XXI. Level-Indicating Means

The NCWM did not adopt specific detailed requirements for level-indicating means, partly on the basis that NTEP could adequately address the suitability of level-indicating means during type evaluation. Consequently, NTEP has added criteria to the scales checklist to check that the level indicators are sufficiently sensitive, rigidly mounted, located such that its location facilitates the use of the level indicator, and that the level indicator is adequately protected from damage.

## XXII. Position Testing of Vehicle Scales

The Technical Committee concluded that the position test and tolerance applied during type evaluation is not required or specified in Handbook 44. Consequently, the Specifications and Tolerances Committee is requested to review this test and either recognize it and its tolerance in Handbook 44, or the test should be eliminated from the type evaluation test process.

The Technical Committee recommends that the mid-section tests be conducted as part of the subsequent field tests for type evaluation, in addition to the initial field test. The justification given was that scale mountings and load cell alignment can shift and scale performance has been found to change at mid-section after a period of use.

Meeting Participants

<u>Name</u>	<u>Organization</u>
Ross Andersen	New York Weights and Measures
John Bartfai	New York Weights and Measures
Manny Bera	Artech Industries
Chet Bradley	A. H. Emery Co.
Kenneth Butcher	Maryland Weights and Measures
Jim Conn	Rice Lake Weighing Systems
Steven Cook	State of California
John Elengo	Revere Corporation of America
Fred Gerk	State of New Mexico
Joe Giannina	Grain Elevator and Processing Soc.
Bill Goodpaster	Cardinal/Detecto
Robert Greene	Sensortronics
Darrell Guensler	State of California
Khalil Haker	BLH Electronics
Dick Hurley	Fairbanks
Terry James	Cardinal/Detecto
Bruce Johnson	Rice Lake Weighing Systems
Ted Johnson	Sensortronics
Philip Katz	HBM, Inc.
John Lacy	USDA Packers & Stockyards
Harry Lockery	Lockery Associates, Inc.
Nigel Mills	Toledo Scale
Frank Nagele	State of Michigan
Karl Newell	National Bureau of Standards
Patrick Nichols	Alameda County, California
Henry Oppermann	National Bureau of Standards
Gary Patterson	Superior Load Cell Co., Inc.

Executive Committee

Meeting Participants (Continued)

Name

Peter Perino  
Millard Polivka  
Bob Reinfried

Maarten Spoor  
Albert Tholen  
Daryl Tonini  
Otto Warnlof  
Simone Yaniv

Kenneth Yee

Organization

Transducers, Inc.  
Toledo Scale  
SMA

Precision Force Inc.  
National Bureau of Standards  
SMA  
National Bureau of Standards/OIML  
National Bureau of Standards

National Bureau of Standards



## APPENDIX H, PART II

Decisions of the NTEP Technical Committee  
Weighing Industry Sector  
June 22-23, 1988

**I. Report on IR 60**

- A. Change Pub. 14, page 134 to have the first and last temperature of the temperature test to be at 20 °C; however, if the temperature range is significantly different from -10 to 40 °C, then test at the near the midpoint of the extremes.
- B. Consensus is to allow individual points to be outside the tolerance, but the average for each test load at each temperature must be within tolerance. This change must be accompanied by establishing appropriate tolerances for repeatability for both class III and III L load cells and scales for type evaluation. This will probably require a change to H-44. Until modified, all points must be within tolerance.
- C. Move toward accepting the new 30-minute creep test proposed for IR 60 along with the new tolerance and the additional tolerance for creep between 20 and 30 minutes. Also, add the return to minimum dead load requirement to H-44. Until changed, the 60-minute test and current tolerance applies.

**II. Permitted values for  $v_{min}$  for multiple load cell applications**

- A. Bounds for  $v_{min}$  values for multiple load-cell applications are  $1.4(\text{cell capacity}/n_{max})$  as the upper bound, and the smallest value for which the load cell will meet the temperature effect on MDLO.
- B.  $v_{min}$  may be different for single and multiple cells. If different, both must be marked on the cell (or on accompanying certificate).
- C. This concept may be applied retroactively, but the manufacturer must request new values for  $v_{min}$ .
- D. Recommend adding a Note to H-44 explaining how to compute if the  $v_{min}$  values for load cells are appropriate for (multiple) load cell applications.

Note: John Elengo subsequently suggested that the analyzing test data for multiple load cell applications and that the maximum value of  $v_{min}$  should simply be  $\text{cell capacity}/n_{max}$ . This proposal was submitted to the Technical Committee by letter ballot and approved. The Executive Committee amended their report, to retain the 1.0 multiplier for the test for the temperature effect on zero for load cells used in multiple. A manufacturer may still have different values for  $v_{min}$  for single and multiple load cell applications, but the maximum value may not exceed  $\text{cell cap}/n_{max}$ .

**III. Temperature effect on MDLO**

- A. Determine temperature effect on MDLO based upon the temperature tests for load cell accuracy.
- B. Manufacturers may use any method available to them for quality control to ensure that load cells comply with requirements.
- C. Manufacturers are reminded not to zero the indicator before starting each test because the actual values are needed for data analysis. Data sets will be rejected if the



indicator is zeroed before each run and the necessary data is not available.

**IV. Number of cells to be tested for multiple load cell applications**

- A. At least one cell must be tested for single cell applications; at least two cells must be tested for multiple load cell applications. This supports current policy.

**V. Marking for repaired equipment**

- A. It was concluded that, although the repair of devices may often affect compliance with the influence factors requirements, the issue of repaired load cells is outside the scope of the Technical Committee. This is an enforcement problem and must be addressed by some other group.
  - 1. The Technical Committee had agreed at its last meeting and the SMA also reached agreement that repaired load cells should be marked as repaired, but no agreement was reached on the broader issue of marking all equipment repaired by other than the manufacturer's authorized representatives.
- B. The Board of Governors states its position on this issue in the Executive Committee Report for the 1988 NCWM. A repaired device is not covered by the original CC if repaired by other than manufacturer's authorized representative. Individual jurisdictions must determine whether or not the repaired device complies with H-44.

**VI. Influence factors on summing boxes**

- A. Summing boxes will not be tested at this time due to the large number of variables and the fact that the effect is often installation dependent.

**VII. Test load at 500v**

- A. Committee recommends that test loads be applied to class III L load cells within 250v of 500v and 1000v, requiring two test loads below 2000v.
- B. Manufacturers and NBS are to evaluate their test equipment, load cell capacities, and range of capacities within families to determine if they can meet this proposal.
- C. Committee recommends that only provisional CCs be issued for load cells that are not tested near 500v and 1000v until the next meeting, when this issue will be addressed to decide whether the test is realistic. If not then considered realistic, load cells not tested at 500v and 1000v may be upgraded to full CCs following the witnessing of testing. Load cells tested at the prescribed loads may receive full CCs before the next meeting if repeat testing is witnessed and meets all requirements.
- D. Restate policy that scales that use load cells with provisional CCs do not require retroactive repairs if subsequent testing reveals that the load cells do not meet the parameters listed on the provisional CC. This policy also covers the case if the number of divisions is reduced on a full CC; however, any new scales manufactured with the load cells in question are limited to the parameters of the new CC. The manufacturer may use other cells that have received CCs and have the parameters of interest to the manufacturer.

**VIII. Policy of extending the range on load cell families that have received full CCs**

- A. Stay with the original policy that any CC based upon manufacturer-submitted data

is provisional until after the lab facilities have been evaluated and repeat testing is witnessed.

#### IX. Marginal test data

- A. Data will be treated on a pass/fail basis.
- B. NTEP may use judgement and request that additional load cell(s) be tested if the data is marginal

#### X. Marking $n_{\max}$ on remote (slave) indicators

- A. S&T is to address the H-44 language of "not permanently attached" and what equipment is interchangeable. Until then, the marking for  $n_{\max}$  is required on the main indicator for a system using slave indicators.
- B. It is not necessary to test slave indicators to the influence factors to assure correct operation over a temperature range. Field enforcement is considered adequate in this case.

#### XI. Markings required on devices and components

- A. It was agreed that requiring the CC number to be marked on a device could possibly replace some of the markings required by H-44. However, it is believed that some information must be marked on the device to assure proper matching of equipment and to facilitate enforcement. The SMA Technical Committee will develop a recommendation to be given to the S&T Committee.

#### XII. Policy on issuing certificates of conformance to distributors

- A. A company that purchases a load cell or device from the manufacturer and then relabels it under its own name must submit a separate request for a CC. It must include a statement that, except for the change in markings, the device is not changed from the original type provided by the manufacturer. No requirements are made regarding test facilities because NTEP cannot tell a manufacturer what type of test facilities are required, nor what is required to maintain quality control.
- B. The manufacturer supplying the device to be relabeled under another company's name must send a letter to NTEP stating that the company is providing the load cell or device to the distributor, that the relabeling has been authorized, and that the device provided to the distributor is identical to the original type for which the manufacturer has received a CC and meets the same specifications and requirements.
- C. If a company that is relabeling equivalent load cells or devices (that is, obtaining equivalent products from multiple suppliers), then the company must assign a unique model designation to each of the devices obtained from different manufacturers. The devices may have the same model series, but must differ by at least a prefix or suffix.
- D. This policy is to be implemented retroactively for load cells and is to be reviewed to see if it is practical to implement retroactively for all devices.

**XIII. Locations for the permanence testing of large capacity scales**

- A. The advantages and disadvantages of testing at the manufacturer's plant were discussed extensively. A consensus could not be reached on criteria to determine whether or not the manufacturer's plant is a suitable installation. It was concluded that testing at the manufacturer's plant is permissible at the discretion and judgement of NTEP.

**XIV. Type evaluation test procedures for vehicle scales**

- A. The Committee agreed that if the NCWM adopts the changes proposed in 320-5, then the following test procedure may be used for the type evaluation of vehicle scales used to weigh highway vehicles. The procedure is limited to scales intended to weigh highway vehicles because scales that weigh off-highway vehicles usually have very large capacities and section capacities. Obtaining the necessary amount of test weights for these very large capacity scales may be extremely difficult.

**B. Initial Test**

1. The minimum amount of known test weight needed for the initial type evaluation test is at least 90 percent of the concentrated load capacity of the scale. Substitution testing may be used to reach the necessary test load.
2. At least two complete sets of section tests to at least 90 percent of the CLC shall be conducted over each section of the scale. This is to determine the repeatability of the scale.
3. At least one complete set of section tests to at least 90 percent of the CLC shall be conducted at midspan between sections.
4. At least one strain load test shall be conducted at each end of the scale. The maximum load applied during the strain load shall be in the range of 80 to 100 percent of scale capacity. The load is to be distributed over the load receiving element.

**C. Subsequent Test**

1. A minimum of 40,000 lb of known test weights are needed, or 50 percent of the CLC, whichever is greater.
2. At least one complete set of section tests shall be conducted over each section and at midspan between each section using the known test weights.
3. At least one strain load test shall be conducted at each end of the scale. The maximum applied load shall be in the range of 65 to 100 percent of scale capacity.

**XV. Influence factors testing on large load cell assemblies**

- A. NBS and NTEP are not expected to develop test facilities to test these large load cell assemblies. The manufacturer is expected to have test facilities to determine if manufactured devices comply with H-44.

- B. Current policy continues to apply, that is, the manufacturer is to submit test data to obtain a provisional CC. If appropriate test facilities exist and repeat testing is witnessed and results comply, then a full CC may be issued. If the manufacturer's test facilities do not exist or are not adequate, then the CC is to be withdrawn.

**XVI. Next meeting**

- A. The next meeting is scheduled for November 2, 1988. This will be a one-day meeting.

APPENDIX I

PRE-NTEP PROVISIONAL CERTIFICATE OF CONFORMANCE

STATE EVALUATION

Pre-NTEP Provision Certificate(s) of Evaluation number(s) \_\_\_\_\_  
\_\_\_\_\_ has (have) been issued for pre-NTEP approved devices that  
are not affected by the influence factors and that satisfy the NTEP requirements for issuing the  
Certificate(s) based on pre-NTEP evaluation by another jurisdiction.

Each pre-NTEP Provisional Certificate will be reconsidered within one year of the date it was issued  
to determine whether or not a Full Certificate of Conformance will be issued. The decision  
regarding issuance of a Full Certificate of Conformance will depend primarily on the experience of  
the states with the device. Please carefully examine the device(s) for which the attached Certificates  
have been issued to determine if they meet all the specifications applicable to the device, and review  
the performance of the devices over time to determine if the performance has been satisfactory.

If you have **EVIDENCE** that a device **DOES NOT** meet the requirements, please complete the form  
below and return it to the:

National Type Evaluation Program, c/o the National Conference on Weights and Measures,  
P.O. Box 3137, Gaithersburg, MD 20878, Attention: Mr. Henry Oppermann.

-----

State: \_\_\_\_\_ Date: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ C.C. No. \_\_\_\_\_

1. Based on our experience, the device referenced above **DOES NOT** meet the requirements  
for issuance of a Certificate of Conformance for the reasons described below (attach  
additional pages if required to describe the deficiencies).

2. Based on our records, the device referenced above **DOES NOT** have a satisfactory history  
of performance for issuance of a Certificate of Conformance for the reasons described  
below (attach additional pages if required to describe deficiencies).

-----

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_





APPENDIX J

SCALE MANUFACTURERS ASSOCIATION

932 Hungerford Drive • #36 • Rockville, Maryland 20850 • (301) 738-2448

January 7, 1988

Mr. Darrell A. Guensler  
Chairman  
National Conference on Weights and Measures  
California Division of Measurement Standards  
8500 Fruitridge Road  
Sacramento, California 95826

Dear Darrell:

In light of the backlog of equipment awaiting certificates of conformance (COC) from OWM/NBS under the NTEP program, the membership of SMA has approved the following recommendation:

For all equipment requiring a certificate of conformance (COC):

SMA recommends that if OWM/NBS is unable to issue a COC or reject the application within 30 days after the availability of test data or within 60 days of the date when the complete equipment application was received by NTEP, then a Provisional COC will be issued until such time as the evaluation can be completed.

We will appreciate your referring this recommendation to the appropriate persons, Darrell. Thanks for your continuing interest and assistance.

Sincerely,

Stephen C. Perry  
President

SCP/bl

cc: John J. Bartfai  
Dr. Ernest Ambler  
Dr. Stanley Warshaw  
Albert Tholen  
SMA Board of Directors

REPORT OF THE  
COMMITTEE ON LAWS AND REGULATIONS

Kendrick J. Simila, Chairman  
Administrator, Weights and Measures Division  
State of Oregon

REFERENCE

KEY NO.

200

INTRODUCTION

This is the Final Report of the Committee on Laws and Regulations for the 73rd Annual Meeting of the National Conference on Weights and Measures. The report is based on the Interim Report (NCWM Publication 16), the Addendum Sheets issued at the meeting, and actions taken by the membership at the meeting.

Table A identifies items in the Report by Reference Key Number, item title, and page number. The titles of voting items are in **bold face print**, with a "V" after the item number. At the Annual Meeting, the Committee groupseed the less controversial voting items into a conesent calendar. These are marked with "VC". In the Report, the key text upon which a vote is to be taken is also highlighted by **bold face print**. Items marked with an "I" after the reference key number are information items. The item marked with a "W" was withdrawn by the Committee at the Annual Meeting.

Much of the Report contains recommendations to revise or amend National Bureau of Standards (NBS) Handbook 130, 1988 edition, "Uniform Laws and Regulations," or NBS Handbook 133, Second Edition, "Checking the Net Contents of Packaged Goods." Proposed revisions to handbooks are shown in **bold face print** by ~~erossing-out~~ what is to be deleted, and underlining what is to be added. Entirely new paragraphs proposed for handbooks are designated as such and shown in **bold face print**.

**Table A**  
**REFERENCE KEY ITEMS AND INDEX**

Reference Key No.		Title of Item	Page
220		HANDBOOK 130: LAWS	
221		UNIFORM WEIGHTS AND MEASURES LAW	
221-1	V	1.XX. Net Weight	148
221-2	VC	12.13. (Reference to Handbook 67) (see 231-6)	149
222	I	UNIFORM WEIGHMASTER LAW	149
230		HANDBOOK 130: REGULATIONS	
231		UNIFORM PACKAGING AND LABELING REGULATION	
231-1	VC	Editorial Review of the Uniform Regulation	151
231-2	I	6.11.3. Rounding	153
231-3	I	8.2.1. Minimum Height of Numbers and Letters	154
231-4	VC	10.9.2.(d) Textiles	155
231-5	VC	10.12. Polyethylene Products: Variations from Declared Thickness (see 240-4A)	155
231-6	VC	12.2. Magnitude of Permitted Variations (see 221-2)	156
232		UNIFORM REGULATION FOR THE METHOD OF SALE OF COMMODITIES	
232-1	VC	1.5. Meat, Poultry, Fish, and Seafood	157
232-2	I	1.5.3.1. Definition of the Term "Processed"	157
232-3	I	1.5.3.3. Oysters by Net Drained Weight	157
232-4A	I	2.3.3. Quantity (of Fireplace and Stove Wood/Wood Chips or Like Products Used for Seasoning)	158
232-4B	V	Animal Bedding	159
232-5	I	2.15. Liquefied Petroleum Gas Cylinder Tare Weights/ Compressed or Liquefied Gases in Cylinders	160
232-6	V	2.19. Gasoline-Alcohol Blends (see 237-2)	160
232-7A	V	Multiple Pricing of Motor Fuels from Single-Price- Computing Dispensers	161
232-7B	W	2.XX. Multiple Unit Prices in Motor Fuel Sales	163
237		UNIFORM REGULATION FOR MOTOR FUEL	
237-1	I	Octane Ratings for Blend Dispensers	169
237-2	I	3. Gasoline-Alcohol Blends (see 232-6)	170
237-3	I	Editorial Reference to ASTM D4814	170

**Table A (Continued)**  
**REFERENCE KEY ITEMS AND INDEX**

Reference Key No.		Title of Item	Page
240		HANDBOOK 133	
240-1A	I	Task Force on Commodity Requirements	170
240-1B	VC	3.XX. Meat and Poultry from Federally Inspected Plants	171
240-1C	VC	2.11. Tare	172
240-2	VC	3.14. Glazed Raw Seafood and Fish	173
240-3A	VC	4.12. Bark Mulch/Delete "Bark"	173
240-3B	VC	4.12. Bark Mulch/Compaction	174
240-3C	I	4.12. Bark Mulch/Test Measure	174
240-4A	VC	2.13. Exceptions to the MAV's Polyethylene/MAV's for Very Thin Film (see 231-5)	175
240-4B	I	Polyethylene/MAV's for Weight vs. MAV's for Thickness	175
240-4C	I	Polyethylene/Test Methods for Draw-String and Zip-Lock Bags	176

**Table B**  
**APPENDICES**

App.	Title	Reference Key No.	Page
A	Report on the Status of Weighmaster Requirements in the States	222	177
B	Draft of Revised Weighmaster Law and Regulation	222	207
C	Draft Test Method for Determining the Net Contents of Packaged Fresh Oysters Labeled by Volume	232-3	215
D	Draft Test Method for Compressed Gases	232-5	218
E	Proposed Test Method for Meat and Poultry Packages from Federally Inspected Plants	240-1B	222

## ORDER OF PRESENTATION

The Report was presented to the membership as follows:

1. The Consent Calendar was presented. Several items were removed from the Consent Calendar to be voted upon separately. The remaining items on the consent calendar (marked "VC" in Table A) were then voted upon.
2. The separate voting items were then presented.
3. The report in its entirety was then ratified.

Table C  
VOTING RESULTS

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
Consent Calendar	44	0	68	0	Passed
221-1	42	4	53	19	Passed
232-4B	43	0	55	15	Passed
232-7A	43	2	75	2	Passed
240-2	46	0	70	0	Passed
240-3A	46	0	60	13	Passed
240-3B	46	0	62	10	Passed
Entire Report	47	0	77	0	Passed



**DETAILS OF ALL ITEMS**  
(In the order they appear in Table A)

- 220            HANDBOOK 130: LAWS
- 221            UNIFORM WEIGHTS AND MEASURES LAW
- 221-1        V    1.XX. NET WEIGHT

(This item was adopted.)

Section 1 of the Uniform Weights and Measures Law contains definitions that apply to all areas of weights and measures. "Weight" is defined as "net weight," but "net weight" is not defined. Last year, the Committee proposed a definition for net weight to be added to the Uniform Law. The item was carried over in order to give the Conference time to study the proposed definition and to determine if there were any problems. The proposed definition was:

**NET WEIGHT.** -- The term "net weight" means the weight of a commodity, or collection of commodities, excluding any material(s) or substance(s) not considered to be part of the commodity, including, but not limited to, containers, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accompaniments, coupons, etc.

Several comments were forwarded concerning the proposed definition:

1. The term "collection of commodities" may be interpreted as not requiring individual net weight declarations for mixtures of commodities put up in the same package; for example, this interpretation could permit labeling net weight only for the combined total of lamb and mint jelly.

There is no prohibition against labeling a mixture of foods in one package by a total net weight declaration if the identity statement is fully informative, for example, "lamb and mint jelly", and in some cases (such as distinctive mixtures of food products) as long as an ingredient statement is also provided. As another example, a frozen dinner may consist of individual servings of meat, potatoes, green vegetable, and dessert. The net weight statement on this type of product is for total weight. Federal regulations also require an ingredient statement for this type of product. At least two sections (in separate regulations) recommended for state adoption require more information than total net weight: Section 1.5.2. of the Uniform Method of Sale of Commodities Regulation (UMSCR) requires that, in the case of stuffed fish, seafood, poultry, or meat, (1) a total net weight of the stuffed product and (2) a minimum net weight of the fish, seafood, poultry, or meat, excluding the stuffing, be declared. However, the proposed definition of net weight is not affected in this circumstance. In the Uniform Packaging and Labeling Regulation (UPLR), a "combination package" (Section 10.5.) is required to bear a declaration of net quantity for each unit of "dissimilar commodities" (with the example given of a household cleaning kit). The proposed definition does not conflict with this requirement either.

2. A recommendation was made that more specific definitions for net weight be added to individual requirements in the UMSCR, rather than appear in the Uniform Weights and Measures Law. This would permit variations in definition for specific commodities or products, in terms of what materials, moisture levels, etc., are or are not to be considered as part of the commodity or product.

Concerning the second comment, no specific instances were provided where the proposed definition would not work or could not be elaborated upon in specific regulations if the need arose. For examples, see sections 1.5.2. of the UMSCR and 10.5. of the UPLR mentioned above.

Since the term "net weight" is generic to weights and measures, the Committee believes there is merit in defining "net weight" in the Law. In order to stress that the definition of net weight encompasses more than packaged goods, the addition of the term "conveyances" after the term "container" has been added. The following definition is recommended for addition to the Uniform Weights and Measures Law:

1.XX. **NET WEIGHT.** -- The term "net weight" means the weight of a commodity, or collection of commodities, excluding any materials, substances, or items not considered to be part of the commodity. Materials, substances, or items not considered to be part of the commodity include, but are not limited to, containers, conveyances, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accompaniments, and coupons.

## 221-2 VC 12.13. (REFERENCE TO HANDBOOK 67)

(This item was adopted as part of the Consent Calendar.)

The National Conference recommends the use of Handbook 133 for package testing. At least 35 states either have adopted Handbook 133 or are in the process of doing so. The Committee is aware of only one of the other 15 states that still specifically references Handbook 67. Since Handbook 67 is out of date and out of print, the Committee believes that references to it should be deleted.

The proposed revision to the Uniform Weights and Measures Law is:

12.13. Weigh, measure, or inspect packaged commodities kept, offered, or exposed for sale, sold, or in the process of delivery, to determine whether they contain the amounts represented and whether they are kept, offered, or exposed for sale in accordance with this Act or regulations promulgated pursuant thereto. In carrying out the provisions of this section, the director shall employ recognized sampling procedures, such as are designated in ~~National Bureau of Standards Handbook 67, "Checking Prepackaged Commodities," or in~~ National Bureau of Standards Handbook 133, "Checking the Net Contents of Packaged Goods."

The Committee believes that the revised wording does not preclude the use of alternative sampling procedures because of the term "such as are designated" in the Law. See Item 231-6 for a companion recommendation.

## 222 I UNIFORM WEIGHMASTER LAW

(This carry-over item was Item 212 in the Report of the 72nd NCWM 1987.) Please see pages 125-126 of the Report of the 72nd National Conference on Weights and Measures 1987 for an earlier discussion.

There is a need to monitor the quality of measurements (not just weighing) that are performed for hire. The Interstate Commerce Commission (overseeing the moving and storage

industry) references state requirements for licensed public weighmasters, wherever these requirements exist. Both a local and a state official at the Interim Meetings reported how often their offices were contacted to locate a weighmaster for hire in their area. Thirty-five states have some form of weighmaster requirements; therefore, deleting the Uniform Weighmaster Law will not be considered.

The Committee conducted a survey on the status of weighmaster requirements in the states. Fifty-two responses (out of fifty-three solicited) were received. The Committee thanks all those who assisted in this data collection. The results of this survey are contained in Appendix A, beginning on page 2-28.

Comments from weights and measures officials concerning their perceived need for weighmaster requirements were not encouraging. Several officials responded in the survey that a weighmaster license implies more quality in a measurement than may be there. Since some state officials also indicated that there are not enough resources to enforce the act or that the act is just a revenue generator, the lack of quality of measurements produced by weighmasters, may in part, be due to a lack of weights and measures resources. Without sufficient resources, it may not be possible to assure that only adequately trained and informed weighmasters are licensed, and that licenses are revoked when poor performance is found. In many cases, the fees that states report charging are not adequate to cover the paperwork, much less case investigation and weighmaster test. The Weighmaster Law should be viewed in the same manner as the Uniform Motor Fuel Law; that is, as a license- or fee-supported program with charges set high enough to provide the enforcement agency enough resources to enforce minimum criteria. Inadequate resources result in an unsatisfactory program. Since weighmaster licensing most directly benefits those businesses that measure for hire, a "user fee" is justified.

The Committee decided to revise the existing Uniform Weighmaster Law and, in addition, to draft a Uniform Weighmaster Regulation to accompany the Law. The revised Law has been pared down to the essentials as compared to the 1965 version. Many options concerning its administration and oversight will be placed in the new Regulation, which has not been completed. The proposed draft of the Uniform Weighmaster Law appears in Appendix B, beginning on page 2-58.

The most significant changes proposed in the revised Law and new Regulation are:

1. The Law broadens the definition of "public weighmaster" to cover other measurements performed for hire.
2. Civil penalties have been introduced, instead of classing all offenses as criminal offenses (as in the 1965 version).
3. Outdated and nonessential requirements, such as a rigid date for license expiration, the use of a notary-type of seal, and the taking of an oath, have been removed from the Law. The requirements for U.S. citizenship and minimum age of 21 years have also been removed.
4. Statements of purpose and scope have been added to the Law.
5. Greater specificity concerning the information required on the certificate has been added to the Law.
6. Provisions have been added to the Law so that all equipment used must meet Handbook 44 requirements.

7. Sections on offenses and penalties have been completely revised and reorganized in the Law.
8. A new section on prohibited acts has been drafted into the Law.
9. A menu of appropriate administrative and enforcement procedures will be drafted as part of the new Regulation. The weights and measures official is expected to use the Regulation as a guide in the administration of the Law. For effective enforcement of the Law, some elements are required, while other features are optional; the latter will be clearly denoted.
10. A general requirement has been added to the Law empowering the state Director to establish the manner in which tare is to be taken. Some survey respondents recommended that tare be determined in every weighing operation. Several examples were given to indicate that requiring tare in every operation may not be appropriate. As one example, holding truck tare weights in computer memory for short time periods at landfill operations was judged appropriate by some weights and measures officials.
11. The requirement in the Law for annual testing of scales by weights and measures officials (formerly Section 12) has been deleted.

The Committee recommends carrying this item over in order to give individual weights and measures agencies and the regional associations an opportunity to study the proposal. The Committee plans to complete formulation of the new regulation at the Interim Meetings in 1989, and to recommend adoption of the new law and regulation at the 74th NCWM, July 1989.

## 230 HANDBOOK 130: REGULATIONS

## 231 UNIFORM PACKAGING AND LABELING REGULATION

### 231-1 VC EDITORIAL REVIEW OF THE UNIFORM REGULATION

(This item was adopted as part of the Consent Calendar.)

(This carry-over item was Item 213-5 in the Report of the 72nd NCWM 1987.) A copy of Virginia's Packaging and Labeling Regulation (and several other Virginia regulations) as revised by a "plain-english expert" was used by the Committee to determine whether any of the suggested changes in wording to the Virginia requirements were appropriate to use to revise the Uniform Packaging and Labeling Regulation.

Many of the recommendations could not be used because they changed the meaning of the original language. However, there were substantial improvements offered in the definitions. The most useful was to simplify all the definitions in the Regulation by eliminating the repetitious clause "...shall be construed to mean...".

The Committee recommends the following editorial changes:

- 2.1. COMMODITY IN PACKAGE FORM. -- ~~The term "commodity-in-package form" shall be construed to mean a~~ A commodity put up or packaged in any manner in advance of sale in units suitable for either wholesale or retail sale. An individual item or lot of any commodity not in package form as defined in this section, but on which there is marked a selling price based on an established price per unit of weight or of measure,



shall be ~~construed to be~~ considered a commodity in package form. Where the term "package" is used in this regulation, it shall be ~~construed to mean~~ "commodity in package form" as here defined.

- 2.2. **CONSUMER PACKAGE: PACKAGE OF CONSUMER COMMODITY.** -- A ~~"consumer package" or "package of consumer commodity"~~ shall be ~~construed to mean a~~ commodity in package form that is customarily produced or distributed for sale through retail sales agencies or instrumentalities for consumption or use by individuals ~~or use by individuals~~ for the purposes of personal care or in the performance of services ordinarily rendered in or about the household or in connection with personal possessions.
- 2.3. **NONCONSUMER PACKAGE: PACKAGE OF NONCONSUMER COMMODITY.** -- A ~~"nonconsumer package" or "package of nonconsumer commodity"~~ shall be ~~construed to mean a~~ Any commodity in package form other than a consumer package, and particularly a package intended solely for industrial or institutional use or for wholesale distribution.
- 2.4. **RANDOM PACKAGE.** -- The term ~~"random package"~~ shall be ~~construed to mean a~~ A package that is one of a lot, shipment, or delivery of packages of the same consumer commodity with various ~~varying~~ weights; that is, packages of the same consumer commodity with no fixed pattern of weight.
- 2.5. **LABEL.** -- The term ~~"label"~~ shall be ~~construed to mean a~~ Any written, printed, or graphic matter affixed to, applied to, attached to, blown into, formed, molded into, embossed on, or appearing upon or adjacent to a consumer commodity or a package containing any consumer commodity, for purposes of branding, identifying, or giving any information with respect to the commodity or to the contents of the package, except that an inspector's tag or other nonpromotional matter affixed to or appearing upon a consumer commodity shall not be ~~deemed to be~~ considered a label requiring the repetition of label information required by this regulation.
- 2.6. **PERSON.** -- The term ~~"person"~~ shall be ~~construed to mean~~ both singular and plural, and shall include any individual, partnership, company, corporation, association, and society.
- 2.7. **PRINCIPAL DISPLAY PANEL OR PANELS.** -- The term ~~"principal display panel or panels"~~ shall be ~~construed to mean~~ (That part, or those parts, of a label that is, or are, so designed as to most likely be displayed, presented, shown, or examined under normal and customary conditions of display and purchase. Wherever a principal display panel appears more than once on a package, all requirements pertaining to the "principal display panel" shall pertain to all such "principal display panels."
- 2.8. **MULTI-UNIT PACKAGE.** -- The term ~~"multi-unit package"~~ shall be ~~construed to mean a~~ A package containing two or more individual packages of the same commodity, in the same quantity, with the individual packages intended to be sold as part of the multi-unit package but ~~capable of being~~ which can be sold individually sold in full compliance with all requirements of this regulation.
- 2.9. **PETROLEUM PRODUCTS.** -- The term ~~"petroleum products"~~ shall be ~~construed to mean~~ Gasoline, diesel fuel, kerosene, or any product (whether or not such a product is actually derived from naturally occurring hydrocarbon mixtures known as "petroleum") commonly used in powering,

lubricating, or idling engines or other devices, or is labeled as fuel to power camping stoves or lights. Therefore, sewing machine lubricant, camping fuels, and synthetic motor oil are "petroleum products" for the purposes of this regulation. Brake fluid, copier machine dispersant, antifreeze, cleaning solvents, and alcohol are not "petroleum products."

The Committee recommends the following additional simplification, strictly editorial in nature:

- 6.9. COUNT: PLY. -- If the commodity is in individually usable units of one or more components or plies, the quantity declaration shall, ~~in addition to complying with other applicable quantity declaration requirements of this regulation,~~ also include the number of plies and total number of usable units.

Roll-type commodities, when perforated so as to identify individual usable units, shall not be ~~deemed to be~~ considered made up of usable units; however, such roll-type commodities shall be labeled in terms of

- (a) total area measurement,
- (b) number of plies,
- (c) count of usable units, and
- (d) dimensions of a single usable unit.

The Committee appreciates the assistance of Virginia Weights and Measures and their staff. A copy of the Virginia Packaging and Labeling Regulation and Method of Sale Regulation will be kept as a reference for alternative wording whenever revisions are proposed or planned to these regulations.

## 231-2 I 6.11.3. ROUNDING

The Committee has been asked by the Industry Committee on Packaging and Labeling (ICPL) to resolve differences among the various rounding rules recommended by Federal Agencies.

Section 6.11.3. of the NCWM Uniform Regulation was developed so that rounding would not cause packages to be found short measure. It recommends (but does not require) that values derived by converting metric to inch-pound quantities (or vice-versa) be truncated by dropping all digits to the right of the first three; that is, that the converted value be rounded down.

The FDA Compliance Policy Guide, issued in March 1987, recommends that values derived by converting inch-pound to metric quantities be rounded up if the value of the right-most dropped digit is 5 or more. (The inch-pound declaration is always considered the primary one and the metric declaration the converted value under FDA's interpretation of the Federal Fair Packaging and Labeling Act.)

NBS Handbook 44 and ASTM E 380-86 "Standard for Metric Practice" recommend rules that do not match either of the two above; that is, they use an "even-odd" rounding rule. The Committee sees no problem with the recommendation in Section 6.11.3. differing from H-44 and ASTM recommendations since the purpose of Section 6.11.3. is to help packagers avoid labeling packages with net contents higher than actual contents merely because of rounding.



The ICPL did not describe any specific regulatory problems resulting from lack of consistency, nor did it state a preferred method; it simply seeks consistency among the regulatory agencies.

Some comments were made that rounding up (FDA recommendation) might be viewed as exaggerating the amount of product in a package and therefore be in conflict with Federal Fair Packaging and Labeling Act principles.

The Committee reconfirms the recommendation in Section 6.11.3. and requests that the Committee on Liaison work with the Food and Drug Administration to accept this recommendation.

### 231-3 I 8.2.1. MINIMUM HEIGHT OF NUMBERS AND LETTERS

The Committee has been asked by the Industry Committee on Packaging and Labeling (ICPL) to review the requirement in the Uniform Packaging and Labeling Regulation that lower case letters (required for most metric symbols) meet the minimum type size. Section 8.2.1. currently reads "In the case of the symbol for milliliter, the "m" shall meet the minimum height standard."

This requirement was added in 1982 based on FDA's recommendations, and tracks FDA regulations (21 CFR 101.105(h)(2)):

"Letter heights pertain to upper case or capital letters. When upper and lower case or all lower case letters are used, it is the lower case letter "o" or its equivalent that shall meet the minimum standards."

The FDA Compliance Policy Guide 7150.17 "Metric Declaration of Quantity of Contents on Product Labels" now specifically recommends that metric declarations meet the type size requirements. Since the symbol for milliliter "mL" is preferred by FDA, a mix of upper and lower case letters on the label net contents declaration will result, with the small "m" setting the minimum type size, even though it may be the only lower case letter in the declaration (for example, "12 FL OZ 354 mL"). Since metric labeling is permissive rather than mandatory, the ICPL views the latest FDA Guide as discouraging metric labeling, due to the added costs of redesigning labels and accommodating a net contents declaration and free space that is, in many cases, twice the size of prior designs. The ICPL suggests that this type size requirement be made consistent with that permitting common fraction numerals to be one-half the minimum height standards. See 21 CFR 101.105 (h)(3):

"When fractions are used, each component numeral shall meet one-half the minimum height standards."

The Committee recommends that:

1. the ICPL or the American National Metric Council transmit their concerns in the form of a petition to FDA, the Federal Trade Commission, and the U.S. Department of Agriculture, that each agency change its minimum type size requirements for metric labeling purposes, permitting the lower case "m" in "mL" to be one-half the minimum height requirements; and
2. the Liaison Committee follow the developments in this area, so that changes to the Uniform Packaging and Labeling Regulation can be initiated in a timely manner if the Federal agencies change their regulations.

231-4 VC 10.9.2.(d) TEXTILES

(This item was adopted as part of the Consent Calendar.)

Sections 10.9.2.(a), (b), and (c) of the Uniform Packaging and Labeling Regulation address fitted sheets, mattress covers, flat sheets, and pillowcases. Last year, changes were made to these sections to require mattress size designations by name, such as "twin" or "queen." At that time, no changes were made to a companion section, 10.9.2.(d) on blankets and bedspreads, in order to give the textile industry time to consider whether mandatory mattress size designations would cause problems. The American Textile Manufacturers Institute reports that they can fully support mandatory size designations on these types of products as well.

The reason for revision of Section 10.9.2.(d) is to require mattress size designations by name (twin, queen, etc.), but only when such names are appropriate; that is, there is some bedding that has not been designed to fit U.S. standard sizes of mattresses. In order to clarify this, the Committee recommends the following:

- (d) The quantity statement for blankets, comforters, quilts, bedspreads, mattress pads, afghans, and throws shall state, in inches or centimeters, the length and width of the finished item. The quantity statement also ~~may~~ shall state the length of any ornamentation and the size designation of the mattress for which the item is designed, such as if it is intended to fit, for example, a "twin," "double," "queen," "king," etc. or "California King" mattress, etc.

231-5 VC 10.12. POLYETHYLENE PRODUCTS; VARIATIONS FROM DECLARED THICKNESS

(This item was adopted as part of the Consent Calendar.)

Section 10.12. of the Uniform Packaging and Labeling Regulation permits an individual thickness measurement of polyethylene to be as much as 20 percent below the labeled thickness as long as the average thickness of a lot, shipment or delivery is equal to or greater than the labeled thickness. This requirement is based on ASTM standard D4397-84, "Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications." Another ASTM standard, D2103-86 "Standard Specification of Polyethylene Film and Sheeting," permits a larger single measurement variation (i.e., 35%) when the film is less than 1 mil (0.001 in) thick. The Committee studied both ASTM standards and found some differences between the two of them; however, members of the polyethylene industry agree that in construction, industrial, and agricultural applications polyethylene would not be less than 1 mil thick, but that food wrap and bags are often less than 1 mil. The reason for the larger single measurement tolerance for polyethylene less than 1 mil thick is that it is difficult to measure the thickness of very thin film without measuring the surface roughness too. An error of measurement of 0.1 mil is only 5% of a 2-mil-thick film, but is 20% of a 0.5-mil film.

The Committee recommends that Section 10.12. of the Uniform Packaging and Labeling Regulation (and Section 2.13. of Handbook 133 -- see Item 240-4A) be revised to recognize the difficulties of measuring very thin polyethylene as follows:

10.12. POLYETHYLENE PRODUCTS: VARIATIONS FROM DECLARED THICKNESS<sup>1</sup>--

(a) Any single measurement of thickness:

(i) When the labeled thickness is less than 1 mil (0.001 in), any individual thickness measurement of a polyethylene product may be as much as 35% below the labeled thickness (i.e., at least 65% of the labeled thickness)<sup>2</sup>

(ii) When the labeled thickness is 1 mil or greater, Any individual thickness measurement of polyethylene sheeting, film, or bag may be as much as 20 percent below the labeled thickness (i.e., at least 80% of the labeled thickness)<sup>3</sup>.

(b) Average thickness for a single package:

The average thickness of a single package of polyethylene sheeting, film, or bags may be as much as 7 percent below the labeled thickness (i.e., at least 93% of the labeled thickness).

231-6 VC 12.2. MAGNITUDE OF PERMITTED VARIATIONS

(This item was adopted as part of the Consent Calendar.)

As reported in Item 221-2, at least 35 states either have adopted Handbook 133 or are in the process of doing so. The NCWM recommends the use of Handbook 133. The Committee is aware of only one of the 15 states that still specifically refers to Handbook 67. Since Handbook 67 is out of date and out of print, the Committee believes that references to it should be deleted.

In order to make this recommendation equivalent to the proposed revision to the Uniform Weights and Measures Law (see Item 221-2), the following revision is proposed:

- 12.2. MAGNITUDE OF PERMITTED VARIATIONS. -- The magnitude of variations permitted under Sections 12., 12.1., 12.1.1., and 12.1.2. of this regulation shall be those expressly set forth in this regulation and variations such as those contained in the procedures and tables of ~~National Bureau of Standards Handbook 67, "Checking Prepackaged Commodities" or National Bureau of Standards Handbook 133, "Checking the Net Contents of Packaged Goods."~~

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<sup>1</sup>In addition, the average net contents of lots, shipments, or deliveries must equal or exceed the labeled net contents. See Section 12.1.

<sup>2</sup>ASTM Standard D2103-86, "Standard Specification of Polyethylene Film and Sheeting," 1986.

<sup>3</sup>ASTM Standard D 4397-84, "Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications," 1984.

**232                    UNIFORM REGULATION FOR THE METHOD OF SALE OF  
                         COMMODITIES**

**232-1    VC    1.5. MEAT, POULTRY, FISH, AND SEAFOOD**

(This item was adopted as part of the Consent Calendar.)

Section 1.5. permits shellfish not included under Section 1.5.3. to be sold by weight, measure, and/or count. Section 1.5.3. covers clams, mussels, and oysters. Lobster and shrimp may therefore be sold by weight, measure, or count. Some retail supermarkets have proposed to weights and measures officials the selling of lobster tails by count. Enforcement authorities have forbidden this, recognizing the trade custom of selling lobster tails by weight, and requiring that this practice be continued so that consumers can make value comparisons (fresh with frozen, for example). However, this might be considered to be in conflict with this section, which permits sale by count.

The Central Weights and Measures Association requested a clarification to indicate that the proposed revision would not permit whole fish to be sold by weight, measure, or count. This was not the Committee's intention; therefore, the following revision is recommended:

**1.5. MEAT, POULTRY, FISH, AND SEAFOOD ... shall be sold by weight, except that whole shellfish in the shell not included under Section 1.5.3. may be sold by weight, measure, and/or count. Shellfish are aquatic animals having a shell, such as mollusks (for example, scallops) or crustaceans (for example, lobster or shrimp).**

Addition of the word "whole" would require items such as crab claws, headless shrimp, lobster tails, and similar products to be sold by weight. The net weight is ordinarily understood to include the weight of the shell. Supplemental statements as to count, for example "24-36 count," as are often provided with shrimp, would still be permitted.

**232-2    I            1.5.3.1. DEFINITION OF THE TERM "PROCESSED"**

Section 1.5.3.1. concerns the method of sale for "processed" clams, mussels, and oysters. A clarification of the term "processed" in Section 1.5.3.1. has been requested by the Shellfish Institute of North America (SINA). SINA has asked whether merely breaking the shellfish open (for example, oysters on the half shell) constitutes "processing," or whether the shellfish must be taken out of its shell before Section 1.5.3.1. applies. SINA points out that the meat is still attached to the shell, and that there is considerable variability in meat to shell weight, making estimates of the net weight very difficult.

With the information at hand, the Committee believes that merely breaking open the shell should not be considered as "processing," but that adding sauces or other ingredients makes the product "processed," whether or not the meat is still attached to the shell. However, the Committee believes it necessary to consult with the Food and Drug Administration as to whether the shell can be considered a part of the net weight when a declaration of weight is required. The Committee will therefore carry this item over.

**232-3    I            1.5.3.3. OYSTERS BY NET DRAINED WEIGHT**

Section 1.5.3.3. requires that fresh oysters, clams, or mussels removed from the shell be sold by fluid volume. A maximum of 15% free liquid by weight is permitted.



North Carolina reported that the largest number of complaints from restaurants and institutions in the state concerns short-measure oysters. Investigations have found product coming from around the nation with the proper fluid volume but with free liquid amounts much higher than the permitted 15% by weight. The Southern Weights and Measures Conference has requested the Liaison Committee and the L&R Committee to study the feasibility of net drained weight, rather than fluid volume, as the required method of sale. The Committee discussed this problem with a representative of the Seafood Institute of North America and has asked that its industry members determine the feasibility of drained weight as an alternative declaration. The Committee will contact the Food and Drug Administration to determine if there are legal impediments to permitting drained weight as an alternative net contents declaration for fresh oysters removed from the shell. The Committee will carry this item over.

A possible problem with poor compliance is the lack of knowledge by weights and measures inspectors concerning the testing of oysters for free liquid. The Committee was furnished a draft test method for determining the net volume and free liquid by weight of oysters, clams, or mussels; it appears as Appendix C of this Report. The Committee encourages all weights and measures jurisdictions to adopt the most recent version of the Uniform Method of Sale of Commodities Regulation, and asks that officials test oysters in consumer-, institutional- and restaurant-sized packages for compliance with their net contents declaration. Comments and recommendations concerning Appendix C are invited.

**232-4A I 2.3.3. QUANTITY (OF FIREPLACE AND STOVE WOOD --  
WOOD CHIPS OR LIKE PRODUCTS USED FOR SEASONING)**

(This carry-over item was Item 214-4 in the Report of the 72nd NCWM 1987.) See the discussion on page 132 of the Report of the 72nd National Conference on Weights and Measures 1987. The original request for establishing a method of sale was made by the state of Oklahoma.

The following recommendations have been made regarding the sale of wood chips such as hickory or mesquite used for seasoning when barbecuing:

1. Develop a method of sale requiring sale by volume.
2. Develop a test method to be used with the method of sale.

Reasons given for sale by volume include:

1. use of the product by volume, and
2. sale by weight requiring allowance for moisture loss.

Reasons given for opposing sale by volume include:

1. compaction after packaging and before sale may substantially reduce the volume at time of sale as compared with the declared volume, and
2. the sale of seasoning products by volume is not compatible with the sale of barbecue briquettes by weight.

No consensus has been developed regarding the proper method of sale for these products. Although the consumer will find it difficult to make value comparisons because of the various methods of sale, the Committee has not yet been provided with evidence that an enforcement problem, in fact, exists.



Wood chip and wood dust products are sold for many uses other than seasoning, including those discussed below.

Scented materials like potpourri. In 1983, the Conference adopted a guideline for the method of sale of potpourri, recommending that sale from bulk or in prepackaged form be either by weight or by dry measure; "decorative containers" put up as "air freshener units" may be labeled by count. See NCWM Publication #3, "NCWM Policy, Interpretations, and Guidelines, Item 2.3.14., and page 209 of the NBS SP 663.

Stove Fuel Pellets. Section 2.3. of the "Uniform Method of Sale of Commodities Regulation" covers stove fuel pellets if made from wood. Section 2.3. applies to all wood, both natural and processed, used for fuel, and requires sale from bulk by the "cord" or cubic meter, with the sale of packaged pellets to be in terms of cubic feet or cubic meters.

Landscaping Materials. If identified as mulch, these commodities are covered by Section 2.17. of the "Uniform Method of Sale of Commodities," which requires that they be sold by volume, cubic yard, cubic meter, or liter.

Animal Bedding. See Item 232-4B.

A guideline (rather than a method of sale requirement in the Uniform Regulation ) would assist the industry by providing suggested uniformity in units of measure, but would not provide states with enforcement powers to eliminate other methods of sale.

The Committee requests that the states provide evidence of a need for action on this commodity to the Regional Associations, along with appropriate recommendations for either a guideline or method of sale. The Committee will take no further action unless a consensus is developed.

## 232-4B V ANIMAL BEDDING

(This item was adopted.)

In a proposal related to wood chips (see Item 232-4A), the Committee was requested to explore a proper method of sale for "animal bedding." Weights and measures officials find the product sold by the "bag." Since many different types of materials are used in animal bedding (paper, wood, peanut hulls, etc.), labeling by weight does not facilitate value comparison. The product is used by volume, and sale by volume provides the most information to the purchaser for making value comparisons. However, compaction of some types of product after shipping can change the volume substantially. Therefore, a method is needed for testing the many types of materials that are sold as animal bedding.

Comments were received that baled straw, often sold for animal bedding, should not be required to be sold by volume. The Committee therefore recommends this guideline to read:

**Animal bedding of all kinds, except for baled straw, should be sold by volume, that is, by the cubic yard, cubic foot, cubic inch, or cubic meter.**

The test method in Handbook 133, Section 4.11. PEAT MOSS, can be used for animal bedding. The test official should "fluff up" or in some way reduce the amount of compaction of product that may occur under ordinary packaging and distribution processes prior to testing.

232-5 I 2.15. LIQUEFIED PETROLEUM GAS CYLINDER TARE WEIGHTS/  
COMPRESSED OR LIQUEFIED GASES IN CYLINDERS.

(This is carried over from Item 214-6 in the Report of the 72nd NCWM 1987, pages 134-136.)

Mr. William Barlen of the Compressed Gas Association (CGA) met with the Committee during the Interim Meetings. A CGA technical work group reviewed the procedures used by California to test compressed gas in cylinders and provided extensive editorial recommendations concerning statements on safety and handling. The official response and advice from CGA has not yet been completed, but a draft is included in Appendix D. The Committee thanks CGA for its assistance. Safety considerations are overriding in the test of these products, and CGA has been most helpful in providing its expertise for the documentation of safe test methods for weights and measures use. CGA intends to provide additional comments and advice to the Conference.

California again requested the Committee to investigate the need for and feasibility of a tighter tolerance on the tare weight of cylinders (now 1%). One industry representative said that a 1 percent tolerance on a 100-lb cylinder may be too much; that the cylinder manufacturers routinely use scales reading to 0.1 lb. The Committee would appreciate comments on this issue and will carry it over.

232-6 I 2.19. GASOLINE-ALCOHOL BLENDS

237-2 I 3. GASOLINE-ALCOHOL BLENDS

It was recommended that both Section 2.19. of the Uniform Regulation for the Method of Sale of Commodities and Section 3. of the Uniform Regulation for Motor Fuel (which are identical in text) be modified to require labeling the presence and amounts of all alcohols, not just ethanol or methanol, on the motor-fuel dispenser.

The proposed revision was:

2.19. GASOLINE - ALCOHOL BLENDS

- 2.19.1. METHOD OF RETAIL SALE. -- All motor fuel kept, offered, or exposed for sale, or sold, at retail containing at least 1 percent by volume of ~~ethanol, methanol, or a combination~~ any alcohol or combination of alcohols shall be identified as such using the words "with" or "containing" (or similar wording) "ethanol," "methanol," or "ethanol/methanol," and in conjunction, shall also identify the maximum volume percentages to the nearest whole percent and the name of each alcohol additive on the upper 50 percent of the dispenser front panel in a position that is clear and conspicuous from the driver's position, in a type at least 1/2 inch in height, 1/16 inch stroke (width of type).

Example 1: CONTAINS 10% ETHANOL

Example 2: CONTAINS ALCOHOL  
5% METHANOL  
5% TERTIARY BUTANOL

- 2.19.2. DOCUMENTATION FOR DISPENSER LABELING PURPOSES.  
--The retailer must be provided, at the time of delivery of the fuel, on an invoice, bill of lading, shipping paper, or other documentation,

the presence and maximum amount of ethanol, methanol, or any ~~combination of ethanol/methanol~~ type of alcohol (in terms of percent by volume) contained in the fuel. This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the motor fuel before blending.

Several reasons were given for the proposal. Alcohols other than ethanol or methanol may be blended with gasoline. One state reported that hundreds of motor vehicles stalled minutes after their tanks were filled with alcohol-blended gasoline, but that the type of alcohol was tertiary butyl alcohol (TBA), not ethanol or methanol. Test reports were passed to the Committee concerning the amount of TBA and methanol in the gasoline purported to be the problems. In discussions during the Interim Meetings, the Committee was apprised of the fact that amounts up to 18% of TBA in gasoline have been given waivers by the Environmental Protection Agency; therefore, the test results given to the Committee of up to 14% of TBA are not necessarily, by themselves, indicators of a poor quality gasoline blend. Therefore, labeling of all alcohols would not, of itself, have prevented the stalled engine problems reported by this one state.

Another reason is that some automotive manufacturers specify a maximum of 3% methanol in gasoline-alcohol blends, but that the gasoline purchaser does not know whether the blend has more than 3% (higher percentages being allowed) if only the presence of methanol is labeled. The labeling recommended by the Conference does not require percentage declarations because it was formulated as a labeling requirement that all states could adopt, not just those with motor-fuel-quality testing capabilities. Weights and measures officials felt that requiring a percentage declaration should be enforceable, and by no means are all states capable of monitoring specific percentage amounts of alcohol blended with the gasoline.

The Committee and the Motor Fuel Task Force developed the present wording as a compromise among the motor vehicle manufacturers, the gasoline manufacturers and retailers, the alcohol blenders, and the weights and measures regulatory agencies. Many materials are added to gasoline and change the composition and performance of the final blend. This proposal focusses upon only one: the presence of alcohols. Olefins, ethers, and other aromatics are blended with gasoline and have the potential of causing problems if the quality of the final product is not controlled, as recommended in the Uniform Motor Fuel Law and Regulation. Since the particular problem motivating the proposal occurred prior to the Conference recommendation to require alcohol labeling on pump dispensers, the Committee believes that no change should be made to the existing recommendations in Handbook 130 concerning gasoline labeling until regulators gain experience in enforcing the present regulation.

#### 232-7A V NCWM POLICY 2.6.4. CASH DISCOUNT PRICE POSTING: MOTOR FUEL DELIVERIES (GAS PUMPS)

(This item was adopted.)

The Committee had proposed a change in Conference policy and a new method of sale that would continue to allow the use of single-price-computing dispensers or pumps to dispense motor fuel being sold at multiple unit prices from those devices, since this practice had been tolerated by weights and measures officials for at least six years. This proposal of the Committee received only mixed support from the weights and measures officials and none from the industry when presented at the Open Hearing of the Annual Meeting. The Committee admits that the issue is unresolved as to whether the practice of setting the single price computing pump to compute at the cash price is legitimately a cash discount. However, having listened to the weights and measures officials at the Annual



Meeting, it is clear that anything less than requiring suitable equipment (i.e. enforcing G-UR.1.1. of Handbook 44) will not be acceptable to the customer nor to the weights and measures enforcement agencies. G.UR.1.1. reads:

G-UR.1.1. SUITABILITY OF EQUIPMENT. - Commercial equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to its weighing capacity (for weighing devices), its computing capability (for computing devices), its rate of flow (for liquid-measuring devices), the character, number, size, and location of its indicating or recording elements, and the value of its smallest unit and unit prices.

Therefore, the Committee recommends a change to NCWM policy regarding multi-tier pricing in motor fuel sales. If anything is needed beyond G.UR.1.1., language should be added to Handbook 44 that will specifically limit the use of dispensers to sales only at the price or prices for which they can compute. If a plan is needed to adopt a changeover time limit for the transition to appropriate equipment, then the Committee recommends that this be coordinated by the S&T Committee. Although the L&R Committee's work on this issue did not develop the desired consensus, the results of its deliberations up to this time are reprinted below Item 232-7B in order to provide a record of the arguments and information brought before the Conference on this important subject.

The Committee recommends changing Conference Policy 2.6.4. Cash Discount Price Posting: Motor Fuel Deliveries (Gas Pumps) appearing in NCWM Publication 3, "Policy, Interpretations and Guidelines," to the following:

**Multi-Tier Pricing Cash-Discount-Price-Posting:  
Motor Fuel Deliveries (Computing Pumps or Dispensers)**

Discounting-for-cash-transactions Charging different prices for the same product depending upon the manner of payment, other purchases, amount of service, etc., is a management decision of the merchandiser. Those merchants who elect to offer-cash-discounts multiple prices for on motor fuel must comply not only with the Federal-Cash-Discount Truth-in-Lending-Act but also with the state and local weights and measure laws and regulations, including Handbook 44. They must also make marketing decisions that comply with state truth in lending, cash discount, price advertising, and usury laws. All such laws are intended to prohibit deceptive, misleading, or misrepresentative information being given to the consumer. The following guidelines are intended to apply to price advertising or posting at the streetside or highway as well as at the pump or dispenser, and to the price computed at the device. These guidelines are applicable to other discount or combination offers (such as combination purchases of car wash and gas, for example.)

1. If a price is posted or advertised, it must be available to all qualified customers. If any condition or qualification is required to obtain the posted price, that condition must also be posted clearly and understandably, in conjunction with the price, wherever it is posted.
2. The cash lowest price may be posted or advertised by itself as long as the sign clearly indicates that the price is limited to cash purchases any restrictions for receiving that price, for example, "cash only", are also clearly posted or advertised in conjunction with the price and as long as other state requirements do not prohibit it. For example, certain states require that all prices available from a given retail location must be posted on streetside signs if any prices are posted.
3. If the merchandiser elects to establish separate devices or islands for credit-card and-for-cash-sales sale of the same product at different prices, the devices or is-

lands shall be clearly identified as "cash," or "credit," "self-serve" or other appropriate wording to avoid customer confusion.

- 5.4. The use of a single-price-computing dispenser for sale of motor fuel at multiple unit prices is inappropriate, facilitates fraud, and should be eliminated. -In order to permit cash and credit card sales multi-tier pricing from a single price-computing dispenser with the minimum amount of customer confusion, the NCWM should adopt a plan and timetable for changeover to devices that can compute and display final money values for either cash or credit card transactions multiple prices.
- 4.5. As an interim practice, if the merchandiser wishes to offer cash discounts off the credit card price as well as permit credit card sales multi-tier pricing from a single dispenser that does not have multi-tier price computing capabilities, a chart expressed in terms of both the total quantity delivered and the total cash discount applicable (in 1-cent increments) shall be prominently displayed so as to be easily ready by the customer at the time of purchase, the dispenser computer should be set to compute at the lowest single purchase unit price (that is, excluding volume sales, fleet sales, or other contract sales) and receipts should be provided for all sales made from that dispenser at higher prices. However, this practice should have only "interim" status.

## 232-7B W 2.XX. MULTIPLE UNIT PRICES IN MOTOR FUEL SALES

The Committee is withdrawing this item but reprints the material below for information only.

### I. COMMITTEE PROPOSAL

Because the material contained in the following report is neither well known or widely understood by all parties affected, the Committee feels additional time is needed to disseminate the information before the requirement becomes effective. The Committee recommends adding the following paragraph to the Uniform Regulation for the Method of Sale of Commodities to become effective on January 1, 1992. The underlining indicates text added to the proposed method of sale appearing in the Committee's Interim Report.

- 2.XX. MULTIPLE UNIT PRICES IN MOTOR-FUEL SALES. --A motor-fuel dispenser that does not have the capability to compute the final prices for all unit prices for which a given product is offered for sale from the dispenser shall be set to compute the total price at the lowest single purchase unit price (that is, excluding volume sales discounts, fleet and other contracts); a receipt shall be given for all sales at other than the lowest unit price. (Effective, January 1, 1992.)

### II. BACKGROUND

The Central Weights and Measures Association proposed adoption of a new method of sale requiring cash price computing in cash/credit sales of motor fuel when the motor fuel dispenser is not capable of dual price computing. A motor fuel purchaser should be able to determine immediately if the final cash price is mathematically correct and not be forced to demand the appropriate discount from the retailer.

At the January 1988 Interim Meeting, several weights and measures officials expressed frustration that lack of evidence prevents them from following up on consumer complaints about not receiving cash discounts: no receipt is provided with a cash motor fuel sale.



A comment was made that if the cash price were computed at the dispenser and the credit card price was higher, the credit card customer would get the credit card receipt. Another comment was that early marketing studies concluded that consumers prefer receiving money back on a transaction, rather than being informed that they owed more than the motor-fuel dispenser indicates. California reported that approximately 20% of undercover purchases of motor fuel resulted in the purchaser not receiving the appropriate cash discount.

California's and other states' reports of high levels of noncompliance persuaded the Committee to recommend revisions to the 1982 NCWM policy on credit and cash discount sales from single-price-computing dispensers and to recommend that a new paragraph be added to the Uniform Regulation for the Method of Sale of Commodities (Item 232-7B). The Committee recommended a change in focus in both recommendations -- from cash discount/credit pricing -- to multiple unit prices, for example, full serve and self serve.

Because of the level of interest their recommendations generated, the Committee held a further meeting with the S&T Committee, weights and measures officials, and industry representatives on this topic on June 21, 1988, at the National Bureau of Standards. The questions to be addressed were:

1. What should states do about the current marketing practice? The L&R Committee sought to provide guidance in this area.
2. What should states do about equipment currently in the field? Both the L&R and S&T Committees must study this issue because both the marketing practices and the limitations of equipment design must be considered.
3. What should be required for the design of future equipment? This is the purview of the S&T Committee since changes to H-44 may be necessary.

### III. ISSUES AND COMMITTEE POSITIONS

Problems and confusion reportedly stem from marketing practices at service stations when product is sold at more than one unit price (called "multi-tier pricing") from dispensers able to compute at only one unit price. The problems are:

1. **Consumer Complaints.** Consumers do not receive advertised discounts to which they are entitled based on the method of payment.
2. **Discount vs. Surcharge.** Setting the dispenser computers on single-price-computing pumps to the cash price might be interpreted as imposing a surcharge for the use of a credit card.
3. **Equipment Replacement.** It might be a massive job to change over to appropriate equipment for multi-tier pricing. Another factor of concern to weights and measures officials is the fact that the equipment is not predominantly owned by the companies that charge for the use of their credit card.
4. **Consumer Confusion.** Customers may be confused by different merchandising methods and operating systems, and may be additionally confused if the practice of setting the dispenser variator to the credit card (higher) price is changed to setting it at the lower cash price.

### 1. Consumer Complaints

Although some states reported at the Interim Meetings that they observed no problem with cash discounting, they provided no data to substantiate their claim. Connecticut and Virginia found the number of complaints on cash discount on the rise since 1985. Michigan reported that although all sales from 15 Detroit stations were cash payments, console management records indicated that 92% of these sales had been computed at the credit amount; yet, no consumer had lodged a complaint. This indicates that complaints are relatively less useful for determining the level of compliance than undercover buying.

A number of states reported at the June meeting the results of undercover buying and analyses of complaints. California reported that more than 13% of stations (randomly selected) offering cash discounts failed to give any discount on the first purchase (based on the 1987/88 year to date summaries). This rate has dropped from almost 20% noncompliance in 1985. Out of 2400 purchases made in the last 4 years in California, 21.7% failed to receive any of the advertised discount. This failure rate includes both random first-time buys and follow-up buys based on complaints or on any first-time buy in which a discount was not given. States and jurisdictions that do undercover buying as a means of following up on complaints report much higher failure rates; Los Angeles County found that more than 31% of their stations did not give advertised discounts, California state follow-ups resulted in 27.6% failure; and Virginia found more than 34% not giving any discounts.

Illinois found every station offering a cash discount to give one, but only 38% of those stations surveyed gave the correct discount. Virginia also reported that 13.4% of the 253 test purchases made this year resulted in an incorrect amount refunded (with an additional 34% not giving any discount) and another 4.4% requiring the purchaser to take additional product instead of money as the discount. Preliminary survey results from Maryland indicate 40% either not giving advertised discounts or giving an incorrect amount.

Representatives from the oil industry reported very low complaint rates to the parent companies. This may be attributable to consumers being more likely to switch to different retailers, or to complain to weights and measures, rather than spend 25 cents on a stamp to complain to the parent company about a 50 cent shortage. A study done for Exxon reported an average of 93% (ranging from 83 to 98%) in compliance, that is, giving the correct cash discount. The Committee was not able to analyze the data collection methods or other study criteria to determine why Exxon's results are so different from weights and measures data. It is possible, for example, that the Exxon study included dispensers capable of computing both cash and credit.

### Committee Conclusions

State undercover buy data and complaint rate data convinces the Committee that the burden of getting the advertised cash discount should be taken off the shoulders of the consumer and put on the retailer by requiring single price computing pumps to compute at the cash price.

The Committee recommends that weights and measures agencies operate undercover buying programs to determine the level of compliance in cash discount programs both from pumps capable of computing multiple unit prices and from single-price-computing pumps.

### 2. Discount Versus Surcharge

Arguments against setting the single price computing dispenser to compute at the cash price are based on whether this practice would constitute levy of a "surcharge" for payment by credit card. If such practice is a "surcharge", then it would be impossible for

the Conference in good conscience to recommend this practice because:

- a. Some states specifically prohibit a surcharge for credit.
- b. Some states limit the amount of finance charges that can be assessed for credit. Since a surcharge is a type of finance charge, it may, when added to the finance charges already assessed by the credit card company, make the total finance charge above the limit the state allows.
- c. Some states have grace period laws. These laws permit a period of time for the credit card holder to pay his balance without incurring any finance charge. Since a surcharge is a type of finance charge, it would be illegal to collect the price differential before the grace period ended.

The Federal Truth in Lending Act (Public Law 96-221, 94 Stat. 170 -- 15 U.S.C. 1604 et seq) defines a "surcharge":

Any means of increasing the **regular price** to a credit card holder which is not imposed on customers paying by cash, check or similar means. (Emphasis added)

This act forbade "surcharges" for credit but that portion of the act lapsed in 1984; all other portions of the act still apply. The Federal Truth in Lending Act still preempts the states from defining a "cash-discount" as a "surcharge" or "finance charge". Therefore, cash discount marketing does not have the legal problems associated with it that surcharging for credit does. Regulations under the act state:

Exception for cash discounts. Discounts offered to induce consumers to pay for property or services by cash, check, or other means not involving the use of either an open-end credit plan or a credit card... may be excluded from the finance charge...

There are two keys to deciding whether a cash discount or credit surcharge is in effect (1) the definition of "regular price" and (2) what is meant by "posting" and "tagging." Regulations under the Federal Truth in Lending Act define "regular price":

Determination of the regular price. The "regular price" is critical in determining whether the difference between the price charged to cash customers and credit customers is a "discount" or a "surcharge," as these terms are defined....The "regular price" is defined...as "the tag or posted price charged for the property or service if a single price is tagged or posted, or the price charged for the property or service when payment is made by use of an open-end credit account or a credit card if either (1) no price is tagged or posted, or (2) two prices are tagged or posted...." For example, in the sale of motor vehicle fuel, the tagged or posted price is the price displayed at the pump. As a result, the higher price (the open-end credit or credit card price) must be displayed at the pump, either alone or along with the cash price. Service station operators may designate separate pumps or separate islands as being for either cash or credit purchases and display only the appropriate prices at the various pumps. If a pump is capable of displaying on its meter either a cash or a credit price depending upon the consumer's means of payment, both the cash price and the credit price must be displayed at the pump. A service station operator may display the cash price of fuel by itself on a curb sign, as long as the sign clearly indicates that the price is limited to cash purchases.

Oil company representatives are concerned that setting the pump at the cash price will be perceived as charging a surcharge for credit, and these companies do not want to risk advising their retailers to do so if they might be legally liable for violating state requirements that apply when cash discounting does not apply.

## Committee Conclusions

Based on its analysis of the regulations under the Federal Truth in Lending Act, the L&R Committee concludes that, as long as the retailer posts both the cash price per gallon and the credit price per gallon, the credit price is indeed the "regular price." There is then no "surcharge", hence a cash discount is in effect.

In commercial sales practice, "posting" the price refers to posting the unit price, not the final computed price. The merchant cannot know the final price until the amount of commodity purchased has been determined. The Committee concludes that "posting" or "tagging" or "displaying" the price is different from setting the pump to compute at the cash price. Under this interpretation, provided that both cash and credit prices are conspicuously posted on the dispenser, the credit price qualifies as the regular price and there is no surcharge. The merchant can continue to advertise that a cash discount is available even though the dispenser computer is set to calculate the final cash price only. Signs at the dispenser might say, for example, "Price computed includes 5 cent cash discount. See attendant for credit sales and receipt." The regular (credit) price must be computed by some other means -- the cash register computer or a calculator, for example.

The regulations under the Truth in Lending Act quoted above specifically permit separate pumps and separate islands for cash and credit. The only difference between devoting separate pumps to cash and to credit on the one hand, or on the other hand setting one pump to compute the cash price but using a calculator or other means to compute the credit total, is the type of equipment used to arrive at the appropriate totals. Therefore, the Committee concludes there is no surcharge solely because the dispenser itself cannot compute the final credit total. If the credit receipt shows the correct final credit price, there is no obvious way to determine the kind of equipment used to derive that final price.

In order to reassure the four major oil companies that are concerned about their liability in this regard, the Committee intends to communicate with the Federal Reserve Board in order to verify its findings. However, it should be pointed out that marketers in several states set the single-price-computing pump to compute at the cash price and have experienced no difficulty.

## Time Needed

Mr. N.D. Smith of the Committee conducted a survey to determine whether states permit setting a single price computing dispenser at the lowest price. The results of that survey indicate that:

1. A total of 19 state directors believe that their state prohibits setting a motor-fuel dispenser at the cash price, then charging a higher price for credit card purchases.
2. A total of 27 state directors think that there are no prohibitions against such practice.
3. Of the 27 state directors who reported no prohibition, 19 were aware that some dispensers are set to compute at the cash price, with a higher price charged for credit. Twenty of those who reported no prohibition also stated that they are not aware of any problems with Federal or state laws in this practice.



The results of this survey convince the Committee that there continues to be confusion among the regulators, and that weights and measures agencies and their legal counsels need time to study and understand the arguments associated with the cash discount/credit surcharge issue. The Committee believes that the present interpretations provided by the Federal Reserve Board clarify this issue, but the interpretations must be followed carefully in order to permit cash discounting and avoid credit surcharging.

Oil company representatives have requested time to improve multi-tier pricing compliance while keeping the single-price-computing pump set at the higher (credit) price. Suggested means for improvement include the educating of service station operators and attendants on cash discounting procedures, improving signs and other consumer information, and increasing company monitoring of operating procedures. Weights and measures enforcement officials can assist by increasing surveillance and instituting undercover buying of motor fuel on a more widespread basis.

### **3. Equipment Replacement**

It is estimated that 70% of gasoline sales nationwide are for cash. Four companies (Exxon, Mobil, Chevron, and Amoco) offer nationwide cash discounts after computation of total price from a single-price-computing dispenser set for the credit card price. We do not know the proportion of cash sales that are cash discount sales, nor do we know the proportion of sales by these four companies that reflect cash discounts from single-price-computing dispensers. Only 30% of the dispensers are oil company owned. Fifty-eight percent (58%) of the dispensers in the U.S. are mechanical devices that cannot be modified to compute multi-tier prices, and another 12% are electronic and cannot be retrofitted to become capable of multi-tier calculation.

### **Committee Conclusions**

From the weights and measures point of view, the best solution is to require that retailers use a pump that can compute at all unit prices at which the product may be sold from that pump (i.e., require that equipment be appropriate for the particular method of sale). Customers can then always see the actual price to be paid. Since some equipment is already available to perform as desired by weights and measures officials, this solution could be implemented immediately.

However, weights and measures officials are reluctant to enforce Handbook 44 requirements for suitability of equipment (G-UR.1.1.) because it would require large capital investments by very small businesses, hence this solution has not yet been implemented. Since inappropriate devices are tolerated, the Committee believes that the minority of sales (credit) should be susceptible to errors made in the final calculation rather than the majority of sales (cash).

The Committee recommends that weights and measures agencies compile data on the number of marketers in their jurisdictions that use single-price-computing pumps set on the credit card price and offering cash discount. This will indicate whether their concern about requiring more appropriate equipment is justified, or whether a very small percentage of existing equipment will be affected.

### **4. Consumer Confusion**

Cash discount marketing has been in effect for about 6 years. Some states permit either cash or credit prices to be calculated by a single-price-computing dispenser. Oregon reported no confusion on the part of consumers with this mixed system. Michigan reported complaints from consumers about stations that set their pumps at the higher credit card price, but no complaints about stations that set their pumps at the cash price. Other



jurisdictions fear that if the predominant method of setting the variator in the dispenser from the credit price is changed to the cash price, consumers will be confused for a period of time and complaints will increase.

### Committee Conclusions

The Committee believes that if a change to the NCWM policy is made, more retailers and weights and measures officials will shift to setting single price computing dispensers to the cash price; consumers will gradually become accustomed to this practice (with proper signs and advertising) and will not be confused. The relatively high rate of failure to give cash discounts or of giving incorrect ones must be counteracted.

The Committee's intent is focused on regulatory tools to help the customer get advertised cash discounts, not to discourage cash discounting. The Committee believes that marketing practices have outpaced equipment capabilities, leading to serious customer confusion, frustration, and even anger. Weights and measures enforcement officials report that they are frustrated in their ability to help the customer in the absence of a transaction receipt, and by the customer's belief that the price displayed by the dispenser is the actual amount owed.

A motor-fuel dispenser that is not capable of computing multiple prices for a single product in a multiple pricing marketing scheme is inadequate unless separate pumps, hoses, or islands are dedicated to the different prices. The Committee believes that, at the least, strong enforcement measures should be taken to provide the customer with basic pricing computation that is not inflated from what is actually owed.

## 237 UNIFORM REGULATION FOR MOTOR FUEL

### 237-1 I OCTANE RATINGS FOR BLEND DISPENSERS

Some oil companies have inquired whether the octane level of gasoline blended in a dispenser is a weights and measures concern. New blending systems can deliver various octanes of gasoline from a single dispenser. If the blending occurs somewhere other than the nozzle, the charged wet hose will contain the previous purchaser's octane selection, which must be delivered before the most recently selected octane blend can be delivered. The L&R Committee believes that accurate delivery of a given octane is generically covered by the General Code requirements of Handbook 44, specifically G-UR.1.1. Suitability of Equipment. However, in a discussion with the S&T Committee and industry representatives, it was decided that S&T should not specify where blending occurs in the dispenser system, but that the octane level delivered by the dispenser should be a concern of state petroleum testing programs.

The issue of where, when, and how much fuel is sampled for quality testing can affect the octane results from a blending dispenser. This decision must take into account the minimum size of a fuel purchase. It was generally agreed that the first pint or quart from the fuel dispenser is too small a sample, but that a five-gallon draft is unnecessarily large. A 1-gallon delivery is a reasonable minimum for motor cycles and lawn equipment purchases. General guidelines that were discussed were:

Draw a sample from the lowest octane setting first, then sample from the highest octane. The most difficult octane test for the blending system to meet is that for the highest octane after the lowest octane has been delivered.

Draw at least a 1-gallon sample, or flush 1 gallon from the system before drawing the 1- or 2-quart sample needed for quality tests.

Return unused blends to the storage tank of lowest octane.

It was generally agreed that ASTM sampling standards do not and cannot cover retail motor fuel sampling as practiced by motor-fuel-quality testing officials. Another potential problem complicating the sampling issue is whether motor fuel quantity and quality samples are drawn at the same time by the same testing personnel or are separately drawn. Inventory control may also be a problem: for example, 50% of the blend could come from the highest octane tank and 50% from the lowest, yet all the blended product would be returned to the lowest octane storage tank.

Mr. N.D. Smith of North Carolina has agreed to circulate draft sampling procedures among those states that routinely sample for octane in their motor-fuel-quality testing activities. The Committee plans to publish the final guidelines for sampling after review by several motor-fuel-quality testing agencies. This item will be carried over.

### 237-2 I 3. GASOLINE-ALCOHOL BLENDS

See Item 232-6 for complete discussion.

### 237-3 I EDITORIAL REFERENCE TO ASTM D4814

At the 72nd Annual Meeting, 1987, the Conference adopted the Uniform Motor Fuel Inspection Law and the Uniform Regulation for Motor Fuel. It was agreed that Section 2.1. of the Regulation would be editorially revised when ASTM P176, the new standard for motor fuel, was adopted by ASTM and assigned an ASTM number. This has occurred. Section 2.1. will now read:

- 2.1. Spark-ignition motor fuel (as defined in this regulation) shall meet ~~the most recently-adopted -ASTM-standard-for~~ ASTM D4814 Standard Specification for Spark-Ignition Engine Fuel, except that volatility standards for unleaded gasoline blends containing up to 10% ethanol shall not be more restrictive than those adopted under the rules, regulations, and Clean Air Act waivers of the U.S. Environmental Protection Agency, and further provided that the gasoline used in the blend meets the volatility specifications of ASTM for the area and season in which the blend is sold.

## 240 HANDBOOK 133

### 240-1A I TASK FORCE ON COMMODITY REQUIREMENTS

In 1987, the Conference adopted methods to be incorporated into Handbook 133 for testing flour packages subject to moisture loss. See Item 230-2, p. 141, Report of the 72nd NCWM 1987.

Continuing its work, the Task Force on Commodity Requirements has developed policy and test methods for checking meat and poultry packages from Federally-inspected plants. The results of a pilot study on meat and poultry indicate that the gray area approach can also be used to determine compliance of meat and poultry products. The Task Force has:

1. developed test procedures that eliminate the potential discrepancies between weights and measures results and USDA test results by using, for example,

Category A sampling plans and dried used tare;

2. determined the size of the gray area as 2-1/2% for hot dogs and 3% for all fresh poultry, for jurisdictions that use wet tare to test meat and poultry from Federally-inspected plants; and
3. recommended procedures to be followed to resolve and correct other problems at the plant as set forth in the Model Agreement Between a State or Local Government and the Food Safety and Inspection Service, USDA.

The Task Force recommends that the gray area approach, as adopted by the Conference in July 1987 for flour, be extended to meat and poultry products packaged at Federally-inspected plants. Policy issues are voted in Item 103-2 in the Executive Committee Report. The complete Task Force report is part of the Executive Committee Report; see Appendix E of that Report.

#### 240-1B VC 3.XX. MEAT AND POULTRY FROM FEDERALLY-INSPECTED PLANTS

(This item was adopted as part of the Consent Calendar.)

Based on the work of the Task Force on Commodity Requirements (see Item 240-1A and 103-2 of the Executive Committee Report), the Executive Committee recommends that the Conference (1) adopt policy for weights and measures officials to use in checking packages of meat and poultry from Federally-inspected plants and (2) incorporate into Handbook 133 the specific procedures that were used during the pilot study conducted in 1987. Appendix E is provided as a stand-alone document that will be modified slightly to fit the format of Handbook 133.

The L&R Committee recommends that Appendix E be added to Chapter 3, "Methods of Test for Packages Labeled by Weight," as Section 3.18. "Meat and Poultry from Federally-Inspected Plants."

The following additional revisions are proposed:

**Revise Section 1.9. ALLOWANCES FOR VARIATIONS DUE TO MOISTURE LOSS OR GAIN, second paragraph, page 1-11 as follows:**

On the basis of technical and regulatory information presently available, the handbook cannot provide definitive moisture allowances for all products; however, it does provide two procedures (for flour, see Section 3.17. and for meat and poultry, see Section 3.18.) for determining compliance with those regulations that allow for quantity variations due to moisture loss or gain. (The agencies responsible for such regulations are listed in Table 1-1, page B-1.)

The above paragraph was revised last year to reference the flour test method. See page 141 of the Report of the 72nd NCWM 1987 for revised language. Handbook 133 has not been republished since the revision was adopted in 1987. Section 2.14. MOISTURE ALLOWANCE was also revised last year by deleting the last sentence on page 2-29 and replacing it with "See also the procedure given for flour in Section 3.17."

**Revise Section 2.14. MOISTURE ALLOWANCE as follows:**

See also the procedures given for flour in Section 3.17. and meat and poultry in Section 3.18.

240-1C VC 2.11. TARE

(This item was adopted as part of the Consent Calendar.)

The following additional changes should be made in Handbook 133 as a result of the additional modifications to the types of tare that may be used when testing meat and poultry from Federally-inspected plants:

See the two bullets on page 2-21 of Handbook 133 defining dry tare and wet tare.

Change the tare definitions as follows:

- o Dry Unused tare (also known as "dry tare") comprises all packaging materials (including glue, labels, ties, etc.) that will contain or enclose a product; it includes prizes, gifts, coupons, or decorations that are not part of the product. Dry Unused tare is measured weighed before the product is introduced into the container. ~~Dry tare is unused tare.~~
- o Wet Used tare comprises all packaging materials that can be separated from the packaged product, ~~whether either~~ readily (e.g., by shaking) or by washing, scraping, ambient air drying, or other techniques involving more than "normal" household recovery procedures, but not including laboratory procedures such as oven drying. As in the dry unused tare definition, prizes, decorations, and such are also part of the-wet used tare

There are two subcategories of "used tare."

"Wet tare". -Wet-tare-is-uUsed tare may also be called "wet tare" when no effort is made to reconstruct unused tare by drying out the absorbent portion of the tare. Free-flowing liquid is part of the wet tare for meat or poultry products from Federally-inspected plants. See Section 3.18.

"Dried used tare" refers to used tare that has been air dried, dried in a microwave oven, over a heating element, or in some other manner, to simulate the unused tare weight. See Section 3.18. for a further explanation of dried used tare.

Also change all references in Handbook 133 from "dry tare" to "unused tare" and where appropriate, from "wet tare" to "used tare" (see Section 3.18. where "wet tare" is appropriately used).

Add in Section 2.11.2. CLEANING TARE MATERIALS, page 2-23 at the top of the page:

See Section 3.18. for specific procedures on obtaining a "dried used tare" weight for meat or poultry from Federally-inspected plants.



## 240-2 V 3.14. GLAZED RAW SEAFOOD AND FISH

(This item was adopted.)

The Central Weights and Measures Association points out that the ice glaze can sometimes be removed from even small to medium-sized shrimp without defrosting the product. Therefore, the Committee recommends that the word "sometimes" be added on the third line from the bottom of the recommended revision:

3. Remove each package from low temperature storage, open it immediately, and place the contents under a gentle spray of cold water. Agitate the product carefully so product is not broken. Continue the spray until all ice glaze that can be seen or felt is removed. In general, the product should remain rigid; however, the ice glaze on certain products, such as small to medium-sized shrimp, sometimes cannot be removed without defrosting the product. Nonetheless, remove the glaze because glazing is a substantial part of the gross package weight.

## 240-3A V 4.12. BARK MULCH/DELETE "BARK"

(This item was adopted.)

The Committee recommends deleting the term "bark" from the test method in Handbook 133, since the method of sale for bark mulch (Section 2.17. of the Uniform Regulation of the Method of Sale of Commodities) was broadened in 1987 to include all mulch. The current test procedures could be interpreted as excluding other mulches such as hardwood and cypress mulch. Additionally, an editorial correction is proposed to replace the term "container" with "test measure." The proposed revision is as follows:

4.12. ~~BARK~~ MULCH

The National Conference on Weights and Measures recommends the following method for testing bark mulch.

## 4.12.1. Equipment

Construct a test measure of materials that will not bulge when filled with mulch (for example, 1/2-inch plywood). Interior dimensions should be 9 inches by 16 inches by 48 inches high, with two opposite inside walls of the measure marked or scribed at 1/2-inch intervals. Other interior dimensions are acceptable as long as the ~~container~~ test measure approximates the configuration of the package under test (e.g., 12- by 12-inch cross section). ~~Container~~ Test measure height may also be reduced from 48 inches, but this will restrict the maximum size of package that can be tested. A lexan or plexiglas<sup>1</sup> side wall is useful for determining the level of fill, but may need to be reinforced.

Each half inch of depth of the test measure is equivalent to 72 cubic inches of volume in the 9- by 16-in or 12- by 12-in configurations.

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<sup>1</sup>The use of brand names does not constitute an endorsement of the product.



#### 4.12.2. Procedure

1. Determine the inspection lot; fill out the report form heading; select the random sample. No tare sample is needed. A special MAV of 5% of the declared volume is applied for bark mulch.
2. Open each package in turn. Empty contents of ~~bag~~ package into ~~container~~ test measure and level the contents by hand. Do not rock, shake, drop, or tamp the ~~container~~ test measure. Read the horizontal marks to determine package net volume.

Record each package error. Package error =  
(package net volume) - (labeled volume)

3. After package errors for the entire sample have been recorded, follow steps 7-11 of the CORE METHOD in Section 3.5. to determine lot conformance.

#### 240-3B V 4.12. BARK MULCH/COMPACTION

(This item was adopted.)

The Central Weights and Measures Association commented that the recommended note to be added to the test procedure is not a panacea for the compaction problem. The Committee recommends the following revision:

NOTE: Some types of mulch are susceptible to clumping and compaction. Steps should be taken to ensure that the material is loose and free flowing when poured into the test measure. Gently rolling the bag before opening will may reduce the compaction of material; using your hands to sift the material as it pours into the measure will may also reduce clumping.

#### 240-3C I 4.12. BARK MULCH/TEST MEASURE

Based upon product measurement tests conducted by the National Bark and Soil Producers Association (NBSPA) for various forms of mulch, the industry requests revision of the test procedure: to replace the 3- or 4-foot-high test measure with a 1-cubic-foot measure. The justification is to better approximate the intended consumer use of mulch products (recommended mulch thicknesses of 4 to 6 inches, for example) and the industry packaging procedures (a depth of 9 to 10 inches of material is conveyed by belt into the packages). The NBSPA believes that this change will eliminate the volume compression that results using the 3-foot-high test measure as compared with the 1-foot-high test measure on 2-cubic-foot and larger sized packages. Data submitted by the NBSPA shows that the quantity determined when using a 1-cubic-foot test measure on 3-cubic-foot packages of bark is greater than that when using a 3-cubic-foot test measure. Weights and measures officials said that the additional time and clean-up necessary when using a 1-cubic-foot measure made fewer tests possible in a given work day. The Committee will ask volunteers to intercompare the differences in testing time and results during the coming year. This item will be carried over.

240-4A VC 2.13. EXCEPTIONS TO THE MAV'S  
POLYETHYLENE/MAV'S FOR VERY THIN FILM

(This item was adopted as part of the Consent Calendar.)

See also Item 231-5. The MAV for an individual measurement of thickness for polyethylene sheeting and film is currently 20%, based on ASTM D4397-84, "Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications." Another ASTM standard, D2103-86, "Standard Specification of Polyethylene Film and Sheeting," permits a larger single measurement variation of 35% when the film is less than 1 mil (0.001 in) thick. The Committee studied both ASTM standards, and found some differences between the two of them. However, members of the polyethylene industry agreed that in construction, industrial, and agricultural applications, polyethylene would not be less than 1 mil thick, but that food wrap and bags are often less than 1 mil. The reason for the larger single measurement tolerance for polyethylene less than 1 mil thick is that it is difficult to measure the thickness of very thin film without measuring the surface roughness too. An error in measurement of 0.1 mil using the dead weight dial micrometer is only 5% of a 2-mil-thick film, but is 20% of a 0.5-mil film.

The Committee recommends that Section 2.13. Exceptions to the MAV's be modified as follows:

Specific Product Exceptions to the MAV:

When labeled thickness is less than 1 mil (0.001 in), any individual thickness measurement of polyethylene sheeting may be as much as 35% below the labeled thickness (i.e., at least 65% of the labeled thickness).<sup>1</sup>

When the labeled thickness is 1 mil or greater, any individual thickness measurement of polyethylene sheeting may be as much as 20% below the labeled thickness (i.e., at least 80%—20% of the labeled thickness).<sup>2</sup>

Add the following footnote to the headings in Section 2.12. MAV's and 2.13. EXCEPTIONS TO THE MAV'S:

In addition, the average net contents of lots, shipments, or deliveries must equal or exceed the labeled net contents. The sampling plans of Category A or B are provided for testing packages subject to the average requirement.

240-4B I POLYETHYLENE/MAV'S FOR WEIGHT VS THOSE FOR THICKNESS

An MAV of 7% for thickness is permitted for a single package (this is an average of several measurements). Thickness translates directly into weight, now that the Conference has adopted a formula for relating thickness to weight. (See Item 230-3, Report of the 72nd NCWM 1987, p. 142.) However, the MAV for weight is much less than 7% (for example, the MAV for 11 lb is 0.22 lb, or 2%). Some industry members have asked whether the MAV's for thickness and for weight can be made more consistent for polyethylene. One manufacturer recommended an MAV of 5% for weight declarations. The Committee

<sup>1</sup>ASTM Standard D2103-86, "Standard Specification of Polyethylene Film and Sheeting," 1986.

<sup>2</sup>ASTM Standard D-4397-84, "Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications," 1984.

will ask selected weights and measures jurisdictions to volunteer data during the coming year on the weights and thicknesses of polyethylene package lots that average at or above the labeled weight and thickness, to determine if there is a need to enlarge the weight MAV's for polyethylene and/or reduce the MAV's for thickness. The Committee will carry this item over.

**240-4C I POLYETHYLENE/TEST METHODS FOR DRAW-STRING AND ZIP-LOCK BAGS**

The Committee was asked to recommend test procedures for use by the industry when declaring the capacity of bags since a capacity statement is required (see the Uniform Regulation for the Method of Sale of Commodities, Sections 2.12.2.2. and 2.12.2.3. and the Uniform Packaging and Labeling Regulation, Section 10.8.2.). A Technical Test Procedure of the Flexible Packaging Association determines capacity of plastic waste and refuse bags, but there is no test method for press-close and draw-string bags. The Committee has asked the Flexible Packaging Association to develop the necessary test methods for use by industry and the weights and measures officials. The Committee will carry this item over.

Kendrick J. Simila, Oregon, Chairman

Barbara J. Bloch, California

Sidney A. Colbrook, Illinois

Allan M. Nelson, Connecticut

N. David Smith, North Carolina

Carroll S. Brickenkamp, NBS, Technical Advisor

**COMMITTEE ON LAWS AND REGULATIONS**

## APPENDIX A

### REPORT ON THE STATUS OF WEIGHMASTER REQUIREMENTS IN THE U.S.

In 1986, the Committee on Laws and Regulations began a study of the Uniform Weighmaster Law. The original law dates from 1950; the only revision since that time was the addition of section titles in 1965. In beginning its study, it was apparent to the Committee that several sections needed significant modification; some requirements have been declared unconstitutional in other laws and regulations (e.g., U.S. citizenship) and other requirements are out-of-date (e.g., the size of the fines). In anticipation of significant updating and revision of the Law, the Committee decided to determine the degree of adoption of the NCWM Uniform Weighmaster Law by the states. In 1986 and 1987, a questionnaire was sent out by the Committee on Laws and Regulations to the state directors of weights and measures. The comparison of the NCWM recommendations with each state's requirements has been completed and is reported on the pages that follow.

#### Summary

Of the 53 respondents (weights and measures directors of the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands), 35 (66%) report having some type of weighmaster licensing or registration program.

#### Administrative Approaches

There is considerable variability in the routine administrative management of weighmaster licensing programs in the states. Of the 35 states that have weighmaster requirements, 16 (46%) report a weighmaster law separate from their weights and measures law. Fourteen report separate regulations to enforce the weighmaster law. Only three states (RI, MA, and WY) administer their weighmaster programs predominantly at the local level.

In general, the cost of administering the program is not recovered by the license fees. Fees for licensing range from no charge to \$200 (the latter fee supporting the state program). Annual license renewal is a feature of 23 weighmaster programs. Ten state license programs have renewal periods of 2 to 5 years.

Twenty-five states (71%) require records retention by the weighmaster. Twenty-four (69%) recognize weight certificates issued under other state weighmaster licensing programs.

#### Extent of Requirements

Five states (ID, IN, ME, VA, and WY) do not require a weighmaster license for doing business as a public weighmaster. At least 10 states require weighmaster licenses only for specific areas, for example, livestock weighing, grain weighing, or moving and storage. Six states require weighmaster licenses principally for road vehicle weighing. Eight states stipulate that weighmaster licenses must be obtained by anyone weighing for hire.



Certain types of weighmaster licenses do not strictly fall under the category of "weighing for hire," but are available under some state programs for those who must operate truck scales, for example, as part of their job. "Limited" (state employee) or "optional" (weights and measures officials, and some others) licensing is available in 12 states (34%).

#### Size of Programs

The number of licenses issued annually by a jurisdiction ranges from 2 to several tens of thousands. By far the largest program is administered by the State of California, which licenses 4000 principal locations, 2000 branch locations, and 35,000 deputy weighmasters.

#### Qualifications

Twelve states (34%) require U.S. citizenship and state residency for licensees. One state official pointed out that these two requirements have been declared unconstitutional in other laws and regulations. Fourteen states (40%) set minimum age requirements; nine at 18 years of age and five at 21 years of age.

Twelve states require the weighmaster to be bonded (which is not a feature of the NCWM recommended law). Twenty-one states (60%) specify that applicants be "of good moral character"; eight of these use character references as sufficient proof of having met this qualification, two by oath or affidavit, and three by investigation of police records.

Twenty-three states (66%) require applicants to be able to weigh accurately; five use personal observation to determine whether applicants qualify, four give examinations, four report that the application form requires the applicant to certify that he or she is capable, two report that the owner of the device or employer of the applicant must certify that the applicant is capable, and two use local enforcement officials to determine the applicant's ability. Twenty-one states (60%) require that applicants be able to fill out the weighing certificates correctly; seven monitor the certificates as they are filed to determine whether the licensee is capable, three give an examination, and four report that the application requires certification that the applicant is capable. Both requirements (capability to weigh accurately and complete certificates correctly) appear to be determined after licensing by many jurisdictions; only 11 states (31%) report that they examine all applicants prior to licensing them. Seven states (20%) give formal examinations; six conduct a written test and six an oral test.

#### Activities and Responsibilities of the Weighmaster

Fourteen states (40%) require applicants to take an oath or sign an affidavit upon entry into duties, and 14 require that the weighmaster furnish a notary-type seal. Fourteen prescribe the form of certificate to be issued by the weighmaster. Only 12 states (34%) require the weighmaster to strike through any entries on the certificate that he or she has not personally determined. Nineteen states (54%) require the weighmaster to identify on the certificate the scale used for determining gross and tare weights and the date of each such determination, if the determinations were made on different scales. Twenty-six states require dating the certificate; 26 require annual testing of the scale by weights and measures enforcement officials. General requirements are that weighmasters must accurately weigh, correctly fill out a certificate of weight, and seal the certificate.



### Prohibitions

Twenty-seven states (77%) specifically prohibit double draft weighing. Two states also prohibit weighing loads of less than 1000 lb on a truck scale. Other prohibitions follow directly from the responsibilities of the weighmaster: requesting or delivering a false weighing (24 states), requesting (24) or delivering (30) a false certificate, or presealing a certificate (20). Most state laws also prohibit any public weighing without a license (22 to 29 states prohibit charging for weighing or acting as a "public weighmaster" without a license).

### Penalties

Thirty-two of the 35 states that have weighmaster requirements can revoke the license for due cause after following administrative procedures. Twenty-seven states classify offenses against their weighmaster acts as misdemeanors; 28 states may fine violators, and 21 may imprison them. However, only four states had one or more convictions under their acts in the last 10 years (one state reported 55 and one state more than 1000). In addition only seven states reported any revocations (from 1 to 11 revocations) of weighmaster licenses in the past 10 years. General comments submitted with the questionnaires indicate very little enforcement of weighmaster requirements because of higher priorities in the average state's weights and measures program.

### Recommendations

Recommendations from the respondents ranged from administrative ("Do away with the notary seal; it takes longer to imprint the seal than to do the weighing") to substantive ("Require the tare to be taken on every bulk weighing"). One significant recommendation is to impose civil penalties rather than criminal for minor infractions. Further information concerning recommendations is given in the Interim Report of the Committee.

Appendix A - Weighmaster Survey

State	Do you have weighmaster requirements?	Is your weighmaster law separate from w&m law?	Citation:
Alabama	yes	yes	Al Code 1975; 8-16-50 thru 8-16-59
Alaska	no		
Arizona	yes	no	41-2093
Arkansas	no		
California	yes	yes	Ca Bus & Prof Code , Div 5, Chap 7
Colorado	yes	no	
Connecticut	yes	no	
Delaware	yes	no	
D.C.	yes	no	DC Code Title 10-130
Florida	no		
Georgia	yes	no	O.C.G.A. 10-2-40
Hawaii	yes	no	HRS 486-27
Idaho	yes	no	Title 71 chap 4
Illinois	no		
Indiana	yes	yes	IC 24-6-3-13
Iowa	yes	yes	214 Public Scales & Gas Pumps
Kansas	no		
Kentucky	no		
Louisiana	yes	no	
Maine	yes	no	Title 10
Maryland	no		
Massachusetts	yes;but not ordinary town apptd weighers	state appts police/motr vehicle wmasters	
Michigan	yes	yes	Mi Compiled Laws 287.123
Minnesota	no		
Mississippi	yes	yes	Senate Bill 2644
Missouri	no		
Montana	no		
Nebraska	no		
Nevada	yes	yes	NRS Chap 582
New Hampshire	yes	no	
New Jersey	yes	no	Title 51:1-73 to 82
New Mexico	yes	yes	57-18-1-18 as amended by Chap 80 laws of 1979
New York	yes	no	Art. 16, Circ.904
North Carolina	yes	no	81A; Article 5
North Dakota	yes	yes	ND Century Code 36-06-05
Ohio	no		
Oklahoma	no		
Oregon	no		
Pennsylvania	yes	yes	Solid Fuel Law July 19, 1935; Public weighmstr Act Apr 28.1961
Puerto Rico	yes	no	WM-4
Rhode Island	yes-city only	no	47-7-1 and 2
South Carolina		yes	39-11-10 et seq
South Dakota	no		
Tennessee	yes	yes	TCA 47-26301 thru 47-26-424; TCA 47-26-801 thru 46-26-814
Texas	yes	yes	13.251 TAC
Utah	yes	yes	Title 4 Ch 30-8
Vermont	yes	no	
Virginia	yes	yes	VA 3.1-970
Virgin Islands	no		
Washington	yes	yes	Weighmaster Act Chap 15.80
West Virginia	no		
Wisconsin	no		
Wyoming	yes	no	

Appendix A - Weighmaster Survey

State	Are there regulations under this law?	Do you license weighmasters?	How many are issued per year?	Is a license required? Sec 4 & 17
Alabama	no	yes	400	yes
Alaska				
Arizona	Article 5	yes	250	yes
Arkansas				
California	CA Admin Code, Title 4, Chap 9, Sub 9, Art 1-9	yes	4000 principal locons; 2000 branch locons; 35000 deputies	yes
Colorado		yes	100	yes
Connecticut		yes	1150	yes
Delaware		yes	650	yes
D.C.	yes	yes	2	yes
Florida				
Georgia		yes	2100	yes
Hawaii	Admin Rules Ch. 88 Tit 4, Subtit 7	yes	1080	yes
Idaho	no	yes	750	no
Illinois				
Indiana	WMReg 6	yes		no
Iowa	214.6, 7, 8	no		no/only an oath
Kansas				
Kentucky				
Louisiana	yes	yes		yes
Maine		yes	300	no
Maryland				
Massachusetts	we appoint weighers on state-wide basis for state police & mtr vehic regis.			
Michigan	no	"register"	30	yes
Minnesota				
Mississippi	no	yes	75	yes
Missouri				
Montana				
Nebraska				
Nevada	NAC 582.010-582.070	yes	80	yes
New Hampshire	Reg #3	yes	350	yes
New Jersey		yes	600	yes
New Mexico	yes	yes	76	yes
New York		yes	2400	yes
North Carolina	Tobacco 2NCAC 38.0500	yes	3500	yes
North Dakota	no	yes	6	yes
Ohio				
Oklahoma				
Oregon				
Pennsylvania	PA Code Title 70 Pt 1, Chap 1 & 3	yes	3200	yes
Puerto Rico		yes	22	yes
Rhode Island	no	no		appointment required
South Carolina	R5-585	yes	300 including deputies	yes
South Dakota				
Tennessee	Chap 0080-5-8 Certif. Pub. Weighers	yes	3000+	yes
Texas	15.141 et seq	yes	2000	yes
Utah	R 52-07	yes	12	yes
Vermont		yes	373	yes
Virginia	no	yes	300	no
Virgin Islands				
Washington	yes	yes		yes
West Virginia				
Wisconsin				
Wyoming	no	no		no

Appendix A - Weighmaster Survey

<i>State</i>	<i>In what areas?</i>	<i>Sec 16</i>
<i>Alabama</i> <i>Alaska</i> <i>Arizona</i> <i>Arkansas</i> <i>California</i>	weighing for hire  public weighing  all purchases, sales, charges for service based on wt or measure	
<i>Colorado</i> <i>Connecticut</i> <i>Delaware</i> <i>D.C.</i> <i>Florida</i>	public scales  solid fuels;live poultry;grain;livestock;commod requir wt certif by purchaser road vehicle weighing; wing for hire;issue weigh slip	
<i>Georgia</i> <i>Hawaii</i> <i>Idaho</i> <i>Illinois</i> <i>Indiana</i>	all commercial weighing Road vehic., bulk weigh, rack mtrs, vehic. tank, gaging, law enforcemnt	
<i>Iowa</i> <i>Kansas</i> <i>Kentucky</i> <i>Louisiana</i> <i>Maine</i>	scales	
<i>Maryland</i> <i>Massachusetts</i>  <i>Michigan</i> <i>Minnesota</i> <i>Mississippi</i>	   livestock only grain; moving & storage	
<i>Missouri</i> <i>Montana</i> <i>Nebraska</i> <i>Nevada</i> <i>New Hampshire</i>	   anyone issuing a certificate of w or m all commercial weighing	
<i>New Jersey</i> <i>New Mexico</i> <i>New York</i> <i>North Carolina</i> <i>North Dakota</i>	for hire livestock; salvage road vehicle weights; other weighing may be required by contract weighing livestock in packing plants	
<i>Ohio</i> <i>Oklahoma</i> <i>Oregon</i> <i>Pennsylvania</i> <i>Puerto Rico</i>	   coal packages; vehicle tanks	
<i>Rhode Island</i> <i>South Carolina</i> <i>South Dakota</i> <i>Tennessee</i> <i>Texas</i>	coal & other merchandise; when demanded for hire; grain moisture meters; in order to issue certif  road vehic; cotton, tobacco, dairy, stockyards, natural resource dealers	
<i>Utah</i> <i>Vermont</i> <i>Virginia</i> <i>Virgin Islands</i> <i>Washington</i> <i>West Virginia</i> <i>Wisconsin</i> <i>Wyoming</i>	livestock markets road vehicle weighing   road vehicle weighing	

Appendix A - Weighmaster Survey

State	Do you distinguish between public and private? Sec 7 Sec 16	Qualifications: U.S. citizen? Sec 3
Alabama	no	
Alaska		
Arizona	yes/ there is no private	
Arkansas		
California	no	
Colorado	no	yes
Connecticut		yes
Delaware	no	
D.C.	no	
Florida		
Georgia	no	yes
Hawaii	no	yes
Idaho	no	
Illinois		
Indiana	no	
Iowa	yes/charge for weighing	no
Kansas		
Kentucky		
Louisiana	no	no
Maine	no	
Maryland		
Massachusetts		
Michigan	no	
Minnesota		
Mississippi	no	yes
Missouri		
Montana		
Nebraska		
Nevada	no	
New Hampshire	yes/public must be licensed; private may be	
New Jersey	yes; public-for hire; private-business	yes
New Mexico	no	yes
New York	no	
North Carolina	no	
North Dakota	no	
Ohio		
Oklahoma		
Oregon		
Pennsylvania	no	unconstitutional
Puerto Rico	no	yes
Rhode Island	no	
South Carolina	no	
South Dakota		
Tennessee	no	
Texas	no	
Utah	no	yes
Vermont	no	yes
Virginia	no	yes; or person lawfully admitted for permanent residence
Virgin Islands		
Washington	no	
West Virginia		
Wisconsin		
Wyoming	no	yes



Appendix A - Weighmaster Survey

State	State residency? Sec 3	Minimum age? Sec 3	Of good moral character?(how determined) Sec 3	Ability to weigh accurately? How is ability determined? Sec 3/5
Alabama Alaska Arizona Arkansas California		yes 18		yes; observation
Colorado Connecticut Delaware D.C. Florida	yes yes	no yes 18	yes; references yes; from application yes; references yes; references	yes; questionnaire yes; from application yes; observation as needed yes; observation
Georgia Hawaii Idaho Illinois Indiana	yes	yes 21	yes; 3 character references yes; oath or affirmation yes; witness	yes; self certification yes; test yes; owner
Iowa Kansas Kentucky Louisiana Maine	no  no	no  no	yes  no yes	yes; but no determination  yes; test yes
Maryland Massachusetts  Michigan Minnesota Mississippi	  yes	  yes 21	  yes; by employer	  yes; by employer
Missouri Montana Nebraska Nevada New Hampshire				yes
New Jersey New Mexico New York North Carolina North Dakota	yes  no	yes 18  yes 18	yes; endorsed by reputable citizen yes; affidavit yes; no felony conviction yes	yes; by local superintendent yes; application yes; local enforcement
Ohio Oklahoma Oregon Pennsylvania Puerto Rico	unconstitute yes	yes 18 yes 21	yes yes; by investigation	yes yes; by exam
Rhode Island South Carolina South Dakota Tennessee Texas	yes yes no yes yes	yes 18 yes 18	yes yes	yes yes; application
Utah Vermont Virginia Virgin Islands Washington West Virginia Wisconsin Wyoming	yes no no  yes	yes 21 yes 18 yes 18  yes 21	yes yes yes; police records	yes; personal observation yes yes; observation

Appendix A - Weighmaster Survey

State	Ability to make correct certificates; (how is ability determined?) Sect 3/5	Is a bond required? How much?
Alabama Alaska Arizona Arkansas California	yes; monitor files	yes; \$1000
Colorado Connecticut Delaware D.C. Florida	yes; questionnaire yes; from application yes; observation as needed	no no
Georgia Hawaii Idaho Illinois Indiana	yes; oversight by department yes; test yes; inspection	yes; \$1000 no no
Iowa Kansas Kentucky Louisiana Maine	yes; oath or weighmaster  yes	no
Maryland Massachusetts  Michigan Minnesota Mississippi	yes; by examination  yes; by employer	yes \$ value/livestock business/week  yes \$5000
Missouri Montana Nebraska Nevada New Hampshire		
New Jersey New Mexico New York North Carolina North Dakota	yes yes; application yes; local enforcement	no yes \$1000
Ohio Oklahoma Oregon Pennsylvania Puerto Rico	yes yes; answers on application form yes; by investigation	yes \$1000  no
Rhode Island South Carolina South Dakota Tennessee Texas	yes; application	yes \$1000 yes \$5000 yes; \$2500-10000 depending on type
Utah Vermont Virginia Virgin Islands Washington West Virginia Wisconsin Wyoming	yes; observation yes yes; observation    appointed by county commissioners	yes \$1000 or trust fund no yes \$1000  yes \$1000

Appendix A - Weighmaster Survey

State	Other requirements?	Do you examine all applicants? Sec 5	Do you require a police back- ground check?
Alabama		no	
Alaska			
Arizona		yes	
Arkansas			
California		no	
Colorado		yes	no
Connecticut		no	
Delaware		no	
D.C.		yes	yes
Florida			
Georgia		yes; certification/3 witnesses	no
Hawaii	oath or affirmation	yes	no
Idaho	no felony conviction	no	no
Illinois			
Indiana		no	
Iowa		no	no
Kansas			
Kentucky			
Louisiana		yes	
Maine		no	
Maryland			
Massachusetts			
Michigan		yes	
Minnesota			
Mississippi		no	
Missouri			
Montana			
Nebraska			
Nevada	properly equipped, qualified, competent, proper character	yes; ability to bond oneself	
New Hampshire	must know how to operate scale	no	
New Jersey		yes	
New Mexico		no	
New York		no	
North Carolina		no	
North Dakota		no	
Ohio			
Oklahoma			
Oregon			
Pennsylvania		no	
Puerto Rico		yes	
Rhode Island			
South Carolina		no	
South Dakota		no	
Tennessee		no	
Texas		no	
Utah		no	no
Vermont		no	
Virginia		yes	yes
Virgin Islands			
Washington		no	
West Virginia			
Wisconsin			
Wyoming		no	

Appendix A - Weighmaster Survey

<i>State</i>	Do you conduct a written test? Sec 5	Do you conduct an oral test? Sec 5	Who is tested? Sec 5	How often? Sec 5
<i>Alabama</i> <i>Alaska</i> <i>Arizona</i> <i>Arkansas</i> <i>California</i>	yes			
<i>Colorado</i> <i>Connecticut</i> <i>Delaware</i> <i>D.C.</i> <i>Florida</i>	yes	yes  yes	  all applicants	  seldom at application
<i>Georgia</i> <i>Hawaii</i> <i>Idaho</i> <i>Illinois</i> <i>Indiana</i>	no yes no	no yes no	all applicants all	upon application
<i>Iowa</i> <i>Kansas</i> <i>Kentucky</i> <i>Louisiana</i> <i>Maine</i>	no  yes	no  yes		
<i>Maryland</i> <i>Massachusetts</i>  <i>Michigan</i> <i>Minnesota</i> <i>Mississippi</i>	  yes			
<i>Missouri</i> <i>Montana</i> <i>Nebraska</i> <i>Nevada</i> <i>New Hampshire</i>				
<i>New Jersey</i> <i>New Mexico</i> <i>New York</i> <i>North Carolina</i> <i>North Dakota</i>		by local w&m		
<i>Ohio</i> <i>Oklahoma</i> <i>Oregon</i> <i>Pennsylvania</i> <i>Puerto Rico</i>	   yes	   yes; also practical exam	all  all applicants	
<i>Rhode Island</i> <i>South Carolina</i> <i>South Dakota</i> <i>Tennessee</i> <i>Texas</i>				
<i>Utah</i> <i>Vermont</i> <i>Virginia</i> <i>Virgin Islands</i> <i>Washington</i> <i>West Virginia</i> <i>Wisconsin</i> <i>Wyoming</i>	no		pers. observn.	

Appendix A - Weighmaster Survey

<i>State</i>	Is there a fee charged for license? Fee amount? Sec 6	Do you provide a "limited" license? Sec 7
<i>Alabama</i>	\$10	no
<i>Alaska</i>		
<i>Arizona</i>	\$40	yes/ law enforcement official
<i>Arkansas</i>		
<i>California</i>	principal \$50; branch \$20; deputy \$10; "at large" \$200	no
<i>Colorado</i>	\$5	yes; special assignment
<i>Connecticut</i>	\$10	no; but there are provisions in the law
<i>Delaware</i>	\$5	yes; state or country operated scales (landfills)
<i>D.C.</i>	\$78	no
<i>Florida</i>		
<i>Georgia</i>	\$5	no
<i>Hawaii</i>	\$20/year	yes/bulk weighing/metering/law enforcem
<i>Idaho</i>	\$10	no
<i>Illinois</i>		
<i>Indiana</i>	none	no
<i>Iowa</i>	none	no
<i>Kansas</i>		
<i>Kentucky</i>		
<i>Louisiana</i>	\$50	no
<i>Maine</i>	\$2	no
<i>Maryland</i>		
<i>Massachusetts</i>		
<i>Michigan</i>	none	no
<i>Minnesota</i>		
<i>Mississippi</i>	\$25	no
<i>Missouri</i>		
<i>Montana</i>		
<i>Nebraska</i>		
<i>Nevada</i>	\$60 initially; \$50 thereafter	no
<i>New Hampshire</i>	\$10	no
<i>New Jersey</i>	\$30/3 years	yes; state law enforcement
<i>New Mexico</i>	\$10	no
<i>New York</i>	\$10	no
<i>North Carolina</i>	\$15	no
<i>North Dakota</i>	\$5	no
<i>Ohio</i>		
<i>Oklahoma</i>		
<i>Oregon</i>		
<i>Pennsylvania</i>	\$30	no
<i>Puerto Rico</i>	\$25 initially; \$15 renewal	yes; w/in scope of official employment
<i>Rhode Island</i>		
<i>South Carolina</i>	\$5 initially \$1 per yr renewal	yes
<i>South Dakota</i>		
<i>Tennessee</i>	\$10	yes; w/in scope of official employment
<i>Texas</i>	\$50 or \$200	no
<i>Utah</i>	\$10	no
<i>Vermont</i>	\$4	no
<i>Virginia</i>	\$10	no
<i>Virgin Islands</i>		
<i>Washington</i>	\$20 license \$5 impression seal	no
<i>West Virginia</i>		
<i>Wisconsin</i>		
<i>Wyoming</i>	none	no



Appendix A - Weighmaster Survey

<i>State</i>	Is license annual? Expiration date? Sec 8	Is weighmaster re- quired to take oath? Sec 8	Must he furnish his own seal? Sec 9
<i>Alabama</i>	yes; 1 yr from date of issue	yes	yes
<i>Alaska</i>			
<i>Arizona</i>	yes; 1 yr from date of issue	yes/affidavit	yes/ordered by w&m/paid for by wmaster
<i>Arkansas</i>			
<i>California</i>	yes; first day of month license first issued	no	no; no seal required
<i>Colorado</i>	no 5 years	no	no
<i>Connecticut</i>	yes Jun 30	no	no
<i>Delaware</i>	yes; Dec 31; legis considering 3 yrs	no	yes
<i>D.C.</i>	yes Jan 31	yes	no
<i>Florida</i>			
<i>Georgia</i>	yes; Jun 30	yes	yes
<i>Hawaii</i>	yes; Jun 30	yes	yes/but we plan to dispense with it
<i>Idaho</i>	yes Jun 30	no	no
<i>Illinois</i>			
<i>Indiana</i>	no every 4 yrs	yes	yes
<i>Iowa</i>	no	yes	no
<i>Kansas</i>			
<i>Kentucky</i>			
<i>Louisiana</i>	yes Dec 31	no	no
<i>Maine</i>	yes Dec 31	yes	yes
<i>Maryland</i>			
<i>Massachusetts</i>			
<i>Michigan</i>	no	no	no
<i>Minnesota</i>			
<i>Mississippi</i>	yes; Jun 30	yes	yes
<i>Missouri</i>			
<i>Montana</i>			
<i>Nebraska</i>			
<i>Nevada</i>	yes; Jan 31	no	no
<i>New Hampshire</i>	yes Dec 31	no	no
<i>New Jersey</i>	no 3 years	yes	yes
<i>New Mexico</i>	yes; calendar year	yes	no
<i>New York</i>	yes; 1 yr from date of issue	no	no
<i>North Carolina</i>	yes; Jun 30	no	no; provided by state
<i>North Dakota</i>	no; every 2 years	no	no
<i>Ohio</i>			
<i>Oklahoma</i>			
<i>Oregon</i>			
<i>Pennsylvania</i>	yes; 12 mon after date of issue	no	yes
<i>Puerto Rico</i>	no; every 2 years	no	yes
<i>Rhode Island</i>			
<i>South Carolina</i>	no; all on 6/30; 3 yr cycle	no	yes
<i>South Dakota</i>			
<i>Tennessee</i>	yes; Jun 30	yes	yes
<i>Texas</i>	no; 2 year	no	no
<i>Utah</i>	yes Dec 31	no	no
<i>Vermont</i>	yes Jun 30	no	no
<i>Virginia</i>	yes; Dec 31	yes	yes
<i>Virgin Islands</i>			
<i>Washington</i>	yes Jun 30	no	no
<i>West Virginia</i>			
<i>Wisconsin</i>			
<i>Wyoming</i>	no	yes	no

Appendix A - Weighmaster Survey

State	Is form of weight certificate prescribed? Sec 10	Must he strike thru entries he doesn't determine? Sec 11	Must he designate which scale used? Sec 11
Alabama	no	no	no
Alaska			
Arizona	yes/provide sample formats	no	no
Arkansas			
California	no; prescribe information that must be on certificate	no	yes
Colorado	yes	yes	yes
Connecticut	no	yes	yes
Delaware	no	no	no
D.C.	no	yes	yes
Florida			
Georgia	no	no	yes
Hawaii	we must approve it	yes	yes
Idaho	yes	no	yes
Illinois			
Indiana	no		yes
Iowa	yes & no	no	yes
Kansas			
Kentucky			
Louisiana	no	no	no
Maine	yes	yes	yes
Maryland			
Massachusetts			
Michigan	no	no	no
Minnesota			
Mississippi	yes	yes	yes
Missouri			
Montana			
Nebraska			
Nevada	yes	yes	no
New Hampshire	no	no	yes
New Jersey	yes	yes	no
New Mexico	yes	no	yes
New York	no	no	no
North Carolina	yes; must include date/wt/measure/count	no	no
North Dakota	no	no	no
Ohio			
Oklahoma			
Oregon			
Pennsylvania	yes	yes	yes
Puerto Rico	no	yes	no
Rhode Island			
South Carolina	no	no	no
South Dakota			
Tennessee	no	no	yes
Texas	no	no	no
Utah	yes	no	yes
Vermont	no	yes	yes
Virginia	no	no	no
Virgin Islands			
Washington	yes	yes	yes
West Virginia			
Wisconsin			
Wyoming	no	no	yes

Appendix A - Weighmaster Survey

<i>State</i>	Are date(s) of weighing(s) required? Sec 11	Is device required to be annually tested? Sec 12	Do you prohibit 2-part double draft weighing? Sec 13
<i>Alabama</i>	yes	yes	yes
<i>Alaska</i>			
<i>Arizona</i>	yes	no	yes
<i>Arkansas</i>			
<i>California</i>	yes	yes	yes
<i>Colorado</i>	yes	yes	yes
<i>Connecticut</i>	yes	yes	yes
<i>Delaware</i>	yes;also vehicle numbers	no; but it must be "suitable"	yes
<i>D.C.</i>	yes	4x per year	no
<i>Florida</i>			
<i>Georgia</i>	yes	yes	yes
<i>Hawaii</i>	yes	yes	yes
<i>Idaho</i>	yes	yes	no
<i>Illinois</i>			
<i>Indiana</i>	yes	yes	yes
<i>Iowa</i>	yes	yes	yes
<i>Kansas</i>			
<i>Kentucky</i>			
<i>Louisiana</i>	no	yes	yes
<i>Maine</i>	yes	yes	yes;except by special permission
<i>Maryland</i>			
<i>Massachusetts</i>			
<i>Michigan</i>	no	must be approved as req by MDA; not annual	yes
<i>Minnesota</i>			
<i>Mississippi</i>	yes	yes	yes
<i>Missouri</i>			
<i>Montana</i>			
<i>Nebraska</i>			
<i>Nevada</i>	yes	suitable; not annual	yes
<i>New Hampshire</i>	yes	yes	yes
<i>New Jersey</i>	no	yes	yes
<i>New Mexico</i>	yes	yes	yes
<i>New York</i>	yes	yes	yes
<i>North Carolina</i>	yes	yes	yes/by regulation
<i>North Dakota</i>	no	yes	yes
<i>Ohio</i>			
<i>Oklahoma</i>			
<i>Oregon</i>			
<i>Pennsylvania</i>	yes	no; not annually	yes
<i>Puerto Rico</i>	no	yes	no
<i>Rhode Island</i>			
<i>South Carolina</i>	no	no	no
<i>South Dakota</i>			
<i>Tennessee</i>	yes	yes	yes
<i>Texas</i>	no	no; device reg under w&m	no
<i>Utah</i>	yes	yes	yes
<i>Vermont</i>	yes	yes	yes
<i>Virginia</i>	yes	yes	no
<i>Virgin Islands</i>			
<i>Washington</i>	yes	yes	yes
<i>West Virginia</i>			
<i>Wisconsin</i>			
<i>Wyoming</i>	yes	yes	yes

Appendix A - Weighmaster Survey

<i>State</i>	Are other measurement practices prohibited?	Must he keep records for a specified period? (How long?) Sec 14
<i>Alabama</i>	Must use equip meeting H-44	yes/1 yr
<i>Alaska</i>		
<i>Arizona</i>	yes/presigned certif/using unlicensed device	yes/ 1 yr
<i>Arkansas</i>		
<i>California</i>	yes: under 1000 lb on truck scale	yes: 4 years
<i>Colorado</i>		yes; 2 yrs
<i>Connecticut</i>	no	yes; 1 yr
<i>Delaware</i>	no	no
<i>D.C.</i>	no	yes;permanently
<i>Florida</i>		
<i>Georgia</i>	no	
<i>Hawaii</i>	none	yes/ 3 yrs/we plan to reduce or do away with it
<i>Idaho</i>	yes; giving false tickets	no
<i>Illinois</i>		
<i>Indiana</i>	1000 lb min	
<i>Iowa</i>		no
<i>Kansas</i>		
<i>Kentucky</i>		
<i>Louisiana</i>	none	no
<i>Maine</i>		yes; 1 yr
<i>Maryland</i>		
<i>Massachusetts</i>		
<i>Michigan</i>		yes; 2 yr
<i>Minnesota</i>		
<i>Mississippi</i>	no	yes; 1 yr
<i>Missouri</i>		
<i>Montana</i>		
<i>Nebraska</i>		
<i>Nevada</i>	no	yes/4 yrs by statute; 3 yrs reg
<i>New Hampshire</i>	no	yes; one year
<i>New Jersey</i>		yes/6 yrs
<i>New Mexico</i>		yes; 1 yr
<i>New York</i>	no	yes
<i>North Carolina</i>	yes; see 81A-55	no
<i>North Dakota</i>		
<i>Ohio</i>		
<i>Oklahoma</i>		
<i>Oregon</i>		
<i>Pennsylvania</i>		yes; 2 yr
<i>Puerto Rico</i>	no	yes; 1 yr
<i>Rhode Island</i>		
<i>South Carolina</i>	no	yes/1 yr
<i>South Dakota</i>		
<i>Tennessee</i>		yes
<i>Texas</i>	yes; false certificate	yes; 5 yr
<i>Utah</i>	yes P&S regulations	yes
<i>Vermont</i>	no	yes; 1 yr
<i>Virginia</i>	no	yes; 1 yr
<i>Virgin Islands</i>		
<i>Washington</i>	no	yes; 1 yr
<i>West Virginia</i>		
<i>Wisconsin</i>		
<i>Wyoming</i>		yes; "reasonable"

Appendix A - Weighmaster Survey

State	Are wt certificates from other states recognized? Sec 15	Is "optional" licensing given to w&m officials? Sec 16	Optional license avail to those employed by comrc'l comp? Sec 16
Alabama	yes	no	no
Alaska			
Arizona	no	no	no
Arkansas			
California	yes; but not specified in the law	no	no
Colorado	no	yes(not optional)	yes (not optional)
Connecticut	yes	yes	yes
Delaware	yes	yes	no
D.C.	yes	yes	no
Florida			
Georgia	no	no	no
Hawaii	no	yes	no
Idaho	yes	yes	
Illinois			
Indiana	yes		
Iowa	yes	no	no
Kansas			
Kentucky			
Louisiana	yes	no	no
Maine	yes	no	
Maryland			
Massachusetts			
Michigan	no	no	
Minnesota			
Mississippi		yes	
Missouri			
Montana			
Nebraska			
Nevada	yes		yes
New Hampshire	yes		
New Jersey	yes	no	yes
New Mexico	yes	yes	no
New York	yes	na	
North Carolina	yes	no	
North Dakota	no		
Ohio			
Oklahoma			
Oregon			
Pennsylvania	yes	no	yes
Puerto Rico	no	yes	no
Rhode Island			
South Carolina	yes	yes	no
South Dakota			
Tennessee	yes	no	
Texas	yes	law not set up like that	
Utah	no	yes	yes
Vermont	yes	yes	yes
Virginia	yes	no	
Virgin Islands			
Washington	yes	no	
West Virginia			
Wisconsin			
Wyoming	yes	no	



Appendix A - Weighmaster Survey

State	Optional license to those under Fed statutes? Sec 16	Optional license to warehousemen & processors? Sec 16	Optional licensing avail- able to other persons?	Prohibitions: Assume title of licensed weighmaster w/o license? Sec 17
Alabama	yes	yes	no	yes
Alaska				
Arizona	yes	no		yes
Arkansas				
California	no	no	no	yes
Colorado	yes (not optional)	yes (not optional)		yes
Connecticut	yes	yes		yes
Delaware	no	no		yes
D.C.	no	no		yes
Florida				
Georgia				yes
Hawaii	no	no	state dept of transportation	yes
Idaho	yes	yes		yes
Illinois				
Indiana				yes
Iowa	no	no		no
Kansas				
Kentucky				
Louisiana	no	no		yes
Maine				yes
Maryland				
Massachusetts				
Michigan				no
Minnesota				
Mississippi	yes	yes		yes
Missouri				
Montana				
Nebraska				
Nevada				yes
New Hampshire				yes
New Jersey	no	no		yes
New Mexico	no	no		yes
New York				yes
North Carolina				yes
North Dakota				
Ohio				
Oklahoma				
Oregon				
Pennsylvania	yes	yes		yes
Puerto Rico	yes	yes	no	yes
Rhode Island				
South Carolina	yes	no	limited licenses are optional	yes
South Dakota				
Tennessee				yes
Texas				yes
Utah	yes	yes		yes
Vermont	yes	yes		yes
Virginia				yes
Virgin Islands				
Washington				yes
West Virginia				
Wisconsin				
Wyoming				

Appendix A - Weighmaster Survey

<i>State</i>	Perform duties w/o license? Sec 17	Hold himself as licensed w/master w/o license? Sec 17	Issue certiff/charge fee w/o license? Sec 17	Engage in public weighing w/o license? Sec 17
<i>Alabama</i>	yes	yes	yes	yes
<i>Alaska</i>				
<i>Arizona</i>	yes	yes	yes	yes
<i>Arkansas</i>				
<i>California</i>	yes	yes	yes	yes
<i>Colorado</i>	yes	yes	no	yes
<i>Connecticut</i>	yes	yes	yes	yes
<i>Delaware</i>	yes	yes	no	yes
<i>D.C.</i>	yes	yes	yes	yes
<i>Florida</i>				
<i>Georgia</i>	yes	yes	no	no
<i>Hawaii</i>	yes	yes	yes	yes
<i>Idaho</i>	yes	yes	no	no
<i>Illinois</i>				
<i>Indiana</i>	yes	yes	no	no
<i>Iowa</i>	no	no	no	no
<i>Kansas</i>				
<i>Kentucky</i>				
<i>Louisiana</i>	no	no	no	no
<i>Maine</i>	yes	yes	yes	yes
<i>Maryland</i>				
<i>Massachusetts</i>				
<i>Michigan</i>	no	no	no	no
<i>Minnesota</i>				
<i>Mississippi</i>	yes	yes	yes	yes
<i>Missouri</i>				
<i>Montana</i>				
<i>Nebraska</i>				
<i>Nevada</i>	yes	yes	yes	yes
<i>New Hampshire</i>	yes	yes	yes	yes
<i>New Jersey</i>	yes	yes	yes	yes
<i>New Mexico</i>	yes	yes	yes	yes
<i>New York</i>	yes	yes	yes	yes
<i>North Carolina</i>	yes	yes	yes	yes
<i>North Dakota</i>				
<i>Ohio</i>				
<i>Oklahoma</i>				
<i>Oregon</i>				
<i>Pennsylvania</i>	yes	yes	yes	yes
<i>Puerto Rico</i>	yes	yes	yes	yes
<i>Rhode Island</i>				
<i>South Carolina</i>	yes	yes	yes	yes
<i>South Dakota</i>				
<i>Tennessee</i>	yes	yes	yes	yes
<i>Texas</i>	yes	yes	no	yes
<i>Utah</i>	yes	yes	yes	yes
<i>Vermont</i>	yes	yes	yes	yes
<i>Virginia</i>	yes	yes	yes	yes
<i>Virgin Islands</i>				
<i>Washington</i>	yes	yes	yes	no
<i>West Virginia</i>				
<i>Wisconsin</i>				
<i>Wyoming</i>				

Appendix A - Weighmaster Survey

<i>State</i>	Can w&m director revoke/suspend license? Sec 18	After 10 days notice and hearing? Sec 18
<i>Alabama</i>	yes; commissioner only	no
<i>Alaska</i>		
<i>Arizona</i>	yes	yes
<i>Arkansas</i>		
<i>California</i>	yes	yes; following administrative procedures
<i>Colorado</i>	yes	yes
<i>Connecticut</i>	yes	yes
<i>Delaware</i>	yes (Secy of Agric)	no
<i>D.C.</i>	yes	
<i>Florida</i>		
<i>Georgia</i>	yes	no
<i>Hawaii</i>	yes	yes
<i>Idaho</i>	yes	no
<i>Illinois</i>		
<i>Indiana</i>	yes	yes
<i>Iowa</i>	yes	hearing but no time limit on notice
<i>Kansas</i>		
<i>Kentucky</i>		
<i>Louisiana</i>	yes	no
<i>Maine</i>	yes	no
<i>Maryland</i>		
<i>Massachusetts</i>		
<i>Michigan</i>	yes; MDA	yes
<i>Minnesota</i>		
<i>Mississippi</i>	yes	yes
<i>Missouri</i>		
<i>Montana</i>		
<i>Nebraska</i>		
<i>Nevada</i>	yes	
<i>New Hampshire</i>	yes	no information
<i>New Jersey</i>	yes	yes
<i>New Mexico</i>	yes	yes
<i>New York</i>	yes (commissioner)	yes (due notice)
<i>North Carolina</i>	yes (commissioner)	yes
<i>North Dakota</i>	yes	after 20 day notice & hearing
<i>Ohio</i>		
<i>Oklahoma</i>		
<i>Oregon</i>		
<i>Pennsylvania</i>	yes	
<i>Puerto Rico</i>	yes	yes
<i>Rhode Island</i>		
<i>South Carolina</i>	yes (commissioner)	no
<i>South Dakota</i>		
<i>Tennessee</i>	yes (commissioner)	yes
<i>Texas</i>	yes (department)	no
<i>Utah</i>	yes	
<i>Vermont</i>	yes	no
<i>Virginia</i>	yes (commissioner)	yes
<i>Virgin Islands</i>		
<i>Washington</i>	yes	yes
<i>West Virginia</i>		
<i>Wisconsin</i>		
<i>Wyoming</i>	no	

Appendix A - Weighmaster Survey

State	What procedures for revoking license?	Upon conviction of violation of act? Sec 18
Alabama Alaska Arizona Arkansas California	written notice of violation/request hearing	yes/after hearing  yes
Colorado Connecticut Delaware D.C. Florida	discretion of Secy of Agric corporation consul	yes yes yes yes
Georgia Hawaii Idaho Illinois Indiana	"reasonable notice"  after 15 days by registered mail	yes yes yes  yes
Iowa Kansas Kentucky Louisiana Maine	no procedures administrative procedures act	yes yes
Maryland Massachusetts  Michigan Minnesota Mississippi		no yes
Missouri Montana Nebraska Nevada New Hampshire	proper hearing	yes yes
New Jersey New Mexico New York North Carolina North Dakota	administrative procedures act  Administrative procedures	yes yes no yes(commissioner) yes
Ohio Oklahoma Oregon Pennsylvania Puerto Rico		yes yes
Rhode Island South Carolina South Dakota Tennessee Texas	after hearing  Administrative Procedures Act	yes(commissioner)  yes(commissioner) yes(department)
Utah Vermont Virginia Virgin Islands Washington West Virginia Wisconsin Wyoming	20 day notice & hearing	yes yes yes  yes  no

Appendix A - Weighmaster Survey

State	Other causes for revoking or suspending?	Offenses: Asking for false weighing? Sec 19
Alabama	issuing false weight certificate	yes
Alaska		
Arizona		no
Arkansas		
California	proof that wmaster cannot capably or reliably perform duties.	yes
Colorado		yes
Connecticut		yes
Delaware	misconduct in office; dishonesty, incompetency; violation of wmaster section	no
D.C.		yes
Florida		
Georgia	failure to pay fee; physical or mental inabil. to function as cpw	yes
Hawaii	conviction of a felony	yes
Idaho	convicted of any felony	yes
Illinois		
Indiana	incompetency; inaccuracy	
Iowa		yes (but act doesnt indicate this)
Kansas		
Kentucky		
Louisiana		no
Maine		
Maryland		
Massachusetts		
Michigan		no
Minnesota		
Mississippi		yes
Missouri		
Montana		
Nebraska		
Nevada	improper maintenance/use of equip; issuance of wt certif w/o all requ info	yes
New Hampshire		yes
New Jersey	false statements on application	yes
New Mexico	violate any provisions of act	yes
New York	dishonesty, incompetency, inaccuracy	yes
North Carolina	refusal to issue certif; false wt	yes
North Dakota		
Ohio		
Oklahoma		
Oregon		
Pennsylvania		yes
Puerto Rico	renewal not on time	yes
Rhode Island		
South Carolina	cannot capably perform duties	yes
South Dakota		
Tennessee		yes
Texas	all acts covered under "for cause"	no
Utah		yes
Vermont	convicted in any court	no
Virginia		yes
Virgin Islands		
Washington		yes
West Virginia		
Wisconsin		
Wyoming		yes



Appendix A - Weighmaster Survey

<i>State</i>	Offenses: Asking for false certificate? Sec 19	Offenses: Falsifying weight certificate? Sec 20	Offenses: Delegate authority to nonlicensee? Sec 20
<i>Alabama</i>	yes	yes	yes
<i>Alaska</i>			
<i>Arizona</i>	no	yes	yes
<i>Arkansas</i>			
<i>California</i>	yes	yes	yes
<i>Colorado</i>	yes	yes	no
<i>Connecticut</i>	yes	yes	yes
<i>Delaware</i>	no	yes	yes
<i>D.C.</i>	yes	yes	yes
<i>Florida</i>			
<i>Georgia</i>	yes	yes	no
<i>Hawaii</i>	yes	yes	yes
<i>Idaho</i>	yes	yes	yes
<i>Illinois</i>			
<i>Indiana</i>			
<i>Iowa</i>	yes (but act doesnt indicate this)	yes (but act doesnt indicate this)	yes (but act doesnt indicate this)
<i>Kansas</i>			
<i>Kentucky</i>			
<i>Louisiana</i>			
<i>Maine</i>	no	yes	yes
<i>Maryland</i>			
<i>Massachusetts</i>			
<i>Michigan</i>	no	yes	yes
<i>Minnesota</i>			
<i>Mississippi</i>	yes	yes	yes
<i>Missouri</i>			
<i>Montana</i>			
<i>Nebraska</i>			
<i>Nevada</i>	yes	yes	yes
<i>New Hampshire</i>	yes	yes	yes
<i>New Jersey</i>	yes	yes	yes
<i>New Mexico</i>	yes	yes	yes
<i>New York</i>	yes	yes	yes
<i>North Carolina</i>	yes	yes	no
<i>North Dakota</i>			
<i>Ohio</i>			
<i>Oklahoma</i>			
<i>Oregon</i>			
<i>Pennsylvania</i>	yes	yes	yes
<i>Puerto Rico</i>	yes	yes	yes
<i>Rhode Island</i>			
<i>South Carolina</i>	yes	yes	no
<i>South Dakota</i>			
<i>Tennessee</i>	yes	yes	yes
<i>Texas</i>	no	yes	no
<i>Utah</i>	yes	yes	yes
<i>Vermont</i>	no	yes	no
<i>Virginia</i>	yes	yes	yes
<i>Virgin Islands</i>			
<i>Washington</i>	yes	yes	yes
<i>West Virginia</i>			
<i>Wisconsin</i>			
<i>Wyoming</i>	yes	yes	no

Appendix A - Weighmaster Survey

State	Offenses: weight certificate? Sec 20	Other offense?
Alabama	yes	
Alaska		
Arizona	yes	
Arkansas		
California	yes	giving false info to wmaster; present false certif for payment; possess blank cert w/o license; not issuing cert when requir. by law
Colorado	no	
Connecticut	yes	
Delaware	yes	
D.C.	yes	
Florida		
Georgia	yes	
Hawaii	no	
Idaho	yes	
Illinois		
Indiana		
Iowa	yes (but act doesnt indicate this)	
Kansas		
Kentucky		
Louisiana		
Maine	yes	
Maryland		
Massachusetts		
Michigan	no	
Minnesota		
Mississippi	yes	
Missouri		
Montana		
Nebraska		
Nevada	no	failure to preserve records; failure to perform duties
New Hampshire	yes	
New Jersey	yes	
New Mexico	yes	
New York	na	
North Carolina	no	
North Dakota		
Ohio		
Oklahoma		
Oregon		
Pennsylvania	yes	
Puerto Rico	yes	
Rhode Island		
South Carolina	no	
South Dakota		
Tennessee	yes	
Texas	no	
Utah	yes	
Vermont	no	
Virginia	yes	
Virgin Islands		
Washington	yes	
West Virginia		
Wisconsin		
Wyoming		failure to deliver cert of wt for which fee is charged

Appendix A - Weighmaster Survey

<i>State</i>	Penalties Misdemeanor? Sec 19,20,21	Penalties: Fine? (Size of fine?) Sec 19,20,21
<i>Alabama</i>	yes	yes \$500
<i>Alaska</i>		
<i>Arizona</i>	yes	yes \$750
<i>Arkansas</i>		
<i>California</i>	yes	\$1000 maximum
<i>Colorado</i>	yes	varies
<i>Connecticut</i>	yes	1st: \$25 - \$100; 2nd: \$100 - \$500
<i>Delaware</i>		1st: \$25 -200; 2nd: \$50 -500
<i>D.C.</i>	yes	up to \$500
<i>Florida</i>		
<i>Georgia</i>	yes	not to exceed \$1000 per violation
<i>Hawaii</i>	yes	\$200
<i>Idaho</i>	no	no
<i>Illinois</i>		
<i>Indiana</i>	no	no
<i>Iowa</i>	yes	\$100/instance
<i>Kansas</i>		
<i>Kentucky</i>		
<i>Louisiana</i>		
<i>Maine</i>	yes	not more than \$100
<i>Maryland</i>		
<i>Massachusetts</i>		
<i>Michigan</i>	yes	\$1,000
<i>Minnesota</i>		
<i>Mississippi</i>	yes	\$100-500
<i>Missouri</i>		
<i>Montana</i>		
<i>Nebraska</i>		
<i>Nevada</i>	yes	
<i>New Hampshire</i>	yes	\$250-\$500
<i>New Jersey</i>	yes	1st:\$50-100;2nd\$100-250; subseq\$250-500
<i>New Mexico</i>	yes	up to \$500
<i>New York</i>	no	\$200 1st offense;\$400 max subsequently
<i>North Carolina</i>	yes	\$50 - \$500
<i>North Dakota</i>	yes	
<i>Ohio</i>		
<i>Oklahoma</i>		
<i>Oregon</i>		
<i>Pennsylvania</i>	no	\$100-200 1st offense
<i>Puerto Rico</i>	yes	\$15-500
<i>Rhode Island</i>		\$20 for sale of merchandise w/o certificate
<i>South Carolina</i>	yes	\$25-100
<i>South Dakota</i>		
<i>Tennessee</i>	yes	
<i>Texas</i>	yes	class B \$1000/1 yr; class C \$200
<i>Utah</i>	Class B	civil penalty up to \$5000
<i>Vermont</i>	yes	1st \$20-200; 2nd \$50-500
<i>Virginia</i>	yes	up to \$1000
<i>Virgin Islands</i>		
<i>Washington</i>	yes;2nd offense-gross misdemeanor	\$100-\$1000
<i>West Virginia</i>		
<i>Wisconsin</i>		
<i>Wyoming</i>	yes	\$10 - \$100

Appendix A - Weighmaster Survey

<i>State</i>	Penalties: Imprisonment? (How long?) Sec 19,20,21	Other penalties?
<i>Alabama</i> <i>Alaska</i> <i>Arizona</i> <i>Arkansas</i> <i>California</i>	6 months  6 months  6 months maximum	infraction: \$100, \$500
<i>Colorado</i> <i>Connecticut</i> <i>Delaware</i> <i>D.C.</i> <i>Florida</i>	no 30 to 90 days 6 months max 6 months	
<i>Georgia</i> <i>Hawaii</i> <i>Idaho</i> <i>Illinois</i> <i>Indiana</i>	up to 3 months 6 months no  no	revocation of license
<i>Iowa</i> <i>Kansas</i> <i>Kentucky</i> <i>Louisiana</i> <i>Maine</i>	depends on subsequent violations	
<i>Maryland</i> <i>Massachusetts</i>  <i>Michigan</i> <i>Minnesota</i> <i>Mississippi</i>	   60 days 6 months	
<i>Missouri</i> <i>Montana</i> <i>Nebraska</i> <i>Nevada</i> <i>New Hampshire</i>	    3 months to 1 year	
<i>New Jersey</i> <i>New Mexico</i> <i>New York</i> <i>North Carolina</i> <i>North Dakota</i>	for lack of payment:1st-10-30 day/subseq 30-90 days up to 90 days  not more than 3 months	
<i>Ohio</i> <i>Oklahoma</i> <i>Oregon</i> <i>Pennsylvania</i> <i>Puerto Rico</i>	   20 days 90 day - 1 yr	
<i>Rhode Island</i> <i>South Carolina</i> <i>South Dakota</i> <i>Tennessee</i> <i>Texas</i>	 30-60 days   unlikely	
<i>Utah</i> <i>Vermont</i> <i>Virginia</i> <i>Virgin Islands</i> <i>Washington</i> <i>West Virginia</i> <i>Wisconsin</i> <i>Wyoming</i>	no 3 months up to 1 yr  30 days-1 yr   no	

Appendix A - Weighmaster Survey

<i>State</i>	How many convictions have you had in last 10 yrs?	How many suspensions/revocations in last 10 yrs?
<i>Alabama</i>	0	0
<i>Alaska</i>		
<i>Arizona</i>	0	0
<i>Arkansas</i>		
<i>California</i>	1000+	0
<i>Colorado</i>	0	0
<i>Connecticut</i>	0	0
<i>Delaware</i>	0	1
<i>D.C.</i>	0	0
<i>Florida</i>		
<i>Georgia</i>	0	0
<i>Hawaii</i>	0	10 (years?)
<i>Idaho</i>	0	2
<i>Illinois</i>		
<i>Indiana</i>	0	0
<i>Iowa</i>	none/penalty increased to misdemeanor	in 1985; no suspensions either
<i>Kansas</i>		
<i>Kentucky</i>		
<i>Louisiana</i>		
<i>Maine</i>	0	0
<i>Maryland</i>		
<i>Massachusetts</i>		
<i>Michigan</i>	1	0
<i>Minnesota</i>		
<i>Mississippi</i>	0	0
<i>Missouri</i>		
<i>Montana</i>		
<i>Nebraska</i>		
<i>Nevada</i>	0	0
<i>New Hampshire</i>	0	0
<i>New Jersey</i>	0	0
<i>New Mexico</i>	0	0
<i>New York</i>	0	0
<i>North Carolina</i>	0	3
<i>North Dakota</i>	0	0
<i>Ohio</i>		
<i>Oklahoma</i>		
<i>Oregon</i>		
<i>Pennsylvania</i>	55	1
<i>Puerto Rico</i>	0	11
<i>Rhode Island</i>		
<i>South Carolina</i>	0	0
<i>South Dakota</i>		
<i>Tennessee</i>	0	0
<i>Texas</i>	0	0
<i>Utah</i>		
<i>Vermont</i>	0	0
<i>Virginia</i>	0	0
<i>Virgin Islands</i>		
<i>Washington</i>	1	1
<i>West Virginia</i>		
<i>Wisconsin</i>		
<i>Wyoming</i>	0	0



Appendix A - Weighmaster Survey

<i>State</i>	<b>Advantages in your requirements?</b>
<i>Alabama Alaska Arizona Arkansas California</i>	We have had no problems with our current law  all weighing must be by licensee; licenses granted to business/location/individuals
<i>Colorado Connecticut Delaware D.C. Florida</i>	makes the weigher responsible for his actions. none question how much security obtained from weighmaster's weight
<i>Georgia Hawaii Idaho Illinois Indiana</i>	no significant problems may preprint seal on weight certificate
<i>Iowa Kansas Kentucky Louisiana Maine</i>	no advantages
<i>Maryland Massachusetts  Michigan Minnesota Mississippi</i>	remove age restriction; existing laws may dictate where fees are deposited/how used
<i>Missouri Montana Nebraska Nevada New Hampshire</i>	one reference to weighmaster is in USDA P&S Act
<i>New Jersey New Mexico New York North Carolina North Dakota</i>	we have never had a problem with a licensed weighmaster
<i>Ohio Oklahoma Oregon Pennsylvania Puerto Rico</i>	maybe need civil penalties in lieu of criminal for minor infractions elim oath/citizenship/residency/rigid date of expiration
<i>Rhode Island South Carolina South Dakota Tennessee Texas</i>	"official wt certificate" not defined
<i>Utah Vermont Virginia Virgin Islands Washington West Virginia Wisconsin Wyoming</i>	no complaints with the program; only covers livestock markets    law would be hard to enforce; if it would require additional positions/more \$(continued)

Appendix A - Weighmaster Survey

<i>State</i>	<i>Short-comings?</i>
<i>Alabama</i> <i>Alaska</i> <i>Arizona</i> <i>Arkansas</i> <i>California</i>	examination of applicants  fines for misdemeanor in Penal code/wmasteer law defines fine for infractions
<i>Colorado</i> <i>Connecticut</i> <i>Delaware</i> <i>D.C.</i> <i>Florida</i>	none don't have manpower to police; generates revenue;costs more than we generate
<i>Georgia</i> <i>Hawaii</i> <i>Idaho</i> <i>Illinois</i> <i>Indiana</i>	hand sealing requires more time than weighing needs revision
<i>Iowa</i> <i>Kansas</i> <i>Kentucky</i> <i>Louisiana</i> <i>Maine</i>	issuance of certificate gives credibility where none should exist  should do more investigation before issuance
<i>Maryland</i> <i>Massachusetts</i>  <i>Michigan</i> <i>Minnesota</i> <i>Mississippi</i>	stagger renewal date; tare should be determined for each weightment no regulations; also no complaints
<i>Missouri</i> <i>Montana</i> <i>Nebraska</i> <i>Nevada</i> <i>New Hampshire</i>	staff shortages to enforce law
<i>New Jersey</i> <i>New Mexico</i> <i>New York</i> <i>North Carolina</i> <i>North Dakota</i>	Issued only 6 last year
<i>Ohio</i> <i>Oklahoma</i> <i>Oregon</i> <i>Pennsylvania</i> <i>Puerto Rico</i>	all bulk commod in vehicle for sale must be weighed by cpw; orig wt certif must
<i>Rhode Island</i> <i>South Carolina</i> <i>South Dakota</i> <i>Tennessee</i> <i>Texas</i>	need staff to enforce law
<i>Utah</i> <i>Vermont</i> <i>Virginia</i> <i>Virgin Islands</i> <i>Washington</i> <i>West Virginia</i> <i>Wisconsin</i> <i>Wyoming</i>	program; only covers  we would have to justify how much \$ it would save consumer or public (continued)

Appendix A - Weighmaster Survey

<i>State</i>	<i>Recommendations for the NCWM Weighmaster Law?</i>
<i>Alabama Alaska Arizona Arkansas California</i>	we have had no problems with current law  no seal required; specify authority wording as alternative to seal
<i>Colorado Connecticut Delaware D.C. Florida</i>	none none law is ok; but weighmaster has low priority
<i>Georgia Hawaii Idaho Illinois Indiana</i>	make it understandable, yet cover all requirements necessary used to have law; was determined to be only a revenue measure forget it; we are considering having law/reg removed
<i>Iowa Kansas Kentucky Louisiana Maine</i>	should exist; would drop if possible Ks has never been able to convince the legislature
<i>Maryland Massachusetts  Michigan Minnesota Mississippi</i>	remove annual device inspect; add appeal rights basic info req: weigh slip/invoice on file
<i>Missouri Montana Nebraska Nevada New Hampshire</i>	seal must be applied over signature
<i>New Jersey New Mexico New York North Carolina North Dakota</i>	see definition of weighmaster in NC law license in ND. Issuing fewer each year only 6 last yr
<i>Ohio Oklahoma Oregon Pennsylvania Puerto Rico</i>	users of devices always a problem  change "carbon" copy to "duplicate" copy be presented to purchaser at time of delivery add certif of correct quantity (eg vehicle tank)
<i>Rhode Island South Carolina South Dakota Tennessee Texas</i>	
<i>Utah Vermont Virginia Virgin Islands Washington West Virginia Wisconsin Wyoming</i>	livestock markets.    would be advantage to threaten someone's livelihood to take (cont. from WI above) weighing seriously, e.g. junk dealers

## APPENDIX B

### PROPOSED REVISION OF UNIFORM WEIGHMASTER LAW

#### SECTION 1. PURPOSE

This Act licenses and regulates public weighmasters in order to ensure accurate measurements by disinterested third parties to a transaction.

#### SECTION 2. SCOPE

This Act establishes a registration, licensing, and enforcement program; provides authority for license fee collection; and empowers the state to promulgate regulations as needed to carry out the provisions of the Act. It provides for optional or voluntary licensing when the employing organization or other organizations require it as part of the condition for employment. It also provides for civil and criminal penalties.

#### SECTION 4-3. DEFINITIONS.

When used in this Act:

3.1. PUBLIC WEIGHING means the weighing, measuring, or counting, upon request, of property, produce, commodities, or articles other than those that the weigher or his/her employer, if any, is either buying or selling.

3.2. PUBLIC WEIGHMASTER means any person who shall perform public weighing as defined in 3.1.

1-1 3.3. LICENSED PUBLIC WEIGHMASTER ---The term "licensed public weighmaster" shall mean and refer to a natural person licensed under the provisions of this Act.

1-2 3.3. VEHICLE ---The term "vehicle" shall mean any device in, upon, or by which any property, produce, commodity, or article is or may be transported or drawn.

1-3 3.4. DIRECTOR ---The term "director" means the \_\_\_\_\_ of the Department of \_\_\_\_\_.

#### SECTION 2-4. ENFORCING OFFICER: RULES AND REGULATIONS

The director is authorized to enforce the provisions of this Act and shall issue from time to time reasonable regulations for the enforcement of this Act, which regulations shall have the force and effect of law. The director may adopt rules that include, but are not

limited to, determining the qualifications of the applicant for a license as a licensed public weighmaster; renewal or refusal of a license; period of license validity; measurement practices that must be followed, including the measurement or recording of tare; the required information to be submitted with or as part of a certificate; and the period of recordkeeping.

#### SECTION 3-5. QUALIFICATIONS FOR WEIGHMASTER

~~A citizen of the United States or a person who has declared his or her intention of becoming such a citizen, who is a resident of the State of -----, not less than 21 years of age, of good moral character, who has the ability to weigh accurately, and to make correct weight certificates, possesses such other qualifications as required by regulation, and who has received from the director a license as a licensed public weighmaster, shall be styled and authorized to act as a licensed public weighmaster.~~

#### SECTION 4-6. LICENSE APPLICATION

An application for a license as a licensed public weighmaster shall be made upon a form provided by the director and the application shall furnish evidence that the applicant has the qualifications required by Section 3 5 of this Act and regulations promulgated under the Act.

#### SECTION 5 7. EVALUATION OF QUALIFICATIONS OF APPLICANTS: RECORDS

~~The director may adopt rules for determining the qualifications of the applicant for a license as a licensed public weighmaster. The director may pass upon the qualifications of the applicant upon the basis of the information supplied in the application, and such other supplementary information as may be required, may examine such applicant orally or in writing, or both, for the purpose of determining his or her qualifications. The director shall grant licenses as licensed public weighmasters to such applicants as may be found to possess the qualifications required by Section 3 5 of this Act. The director shall keep a record of all such applications and of all licenses issued thereon.~~

#### SECTION 6 8. LICENSE FEES

The director shall have the authority to set fees for the administration of the licensing program. Before the issuance of any license as a licensed public weighmaster, or any renewal thereof, the applicant shall pay to the director a fee of \$\_\_\_\_\_ for the purposes of administering and effectively enforcing the provisions of this Act. ~~Such fees shall be deposited with the State Treasurer to be credited to a fund to be used by the director for the administration of this Act.~~

#### SECTION 7 - LIMITED LICENSES

~~The director may, upon request and without charge, issue a limited license as a licensed public weighmaster to any qualified officer or employee of a city or county of this State or of a State commission, board, institution, or agency, authorizing such officer or employee to act as a licensed public weighmaster only within the scope of his official employment in the case of an officer or employee of a city or county or only for and on behalf of the State commission, board, institution, or agency in the case of an officer or employee thereof.~~



## SECTION 9. LICENSES: PERIOD, RENEWAL

Each license as licensed public weighmaster shall be issued for a period to expire as established by the director, on the thirty-first day of December of the calendar year for which it is issued. ~~Provided, That any such license shall be valid through the thirty-first day of January of the next ensuing calendar year or until issuance of the renewal license, whichever event first occurs, if the holder thereof shall have filed a renewal application with the director on or before the fifteenth day of December of the year for which the current license was issued. And provided further, That any license issued on or after the effective date of this Act and on or before the thirty-first day of December 19--,~~ shall be issued to expire on the thirty-first day of December of the next ensuing calendar year. ~~Renewal applications shall be in such form as the director shall prescribe.~~

## SECTION 9. LICENSED WEIGHMASTER: OATH, SEAL

Each licensed public weighmaster shall, before entering upon his or her duties, make oath to execute faithfully his or her duties. ~~The issuance of a license as licensed public weighmaster shall not obligate the State to pay to the licensee any compensation for his or her services as a licensed public weighmaster. Each licensed public weighmaster shall, at his or her own expense, provide himself or herself with an impression seal. His or her name and the word(s) (insert name of State) shall be inscribed around the outer margin of the seal and the words "licensed public weighmaster" shall appear in the center thereof. The seal shall be impressed upon each weight certificate issued by a licensed public weighmaster.~~

## SECTION 10. WEIGHT CERTIFICATE: REQUIRED ENTRIES

The director shall prescribe the form of weight certificate to be used by a licensed public weighmaster. The weight certificate shall may include, but is not limited to, the following information:

- (1) The name and license number of the licensed public weighmaster
- (2) The kind of commodity weighed, measured or counted
- (3) The name of the owner, agent or consignee of the commodity
- (4) The name of the recipient of the commodity, if applicable
- (5) The date the certificate is issued
- (6) The identification, including the identification number, if any, of the carrier transporting the commodity
- (7) Such other information as may be necessary to distinguish or identify the commodity from a like kind.
- (8) The number of units of the commodity, if applicable
- (9) The measure of the commodity, if applicable
- (10) The weight of the commodity and the vehicle or container (if applicable) broken down as follows:
  - (i) The gross weight of the commodity and the vehicle or container thereof;
  - (ii) The tare weight of the unladen vehicle or container; or
  - (iii) Both the gross and tare weight and the resultant net weight of the commodity

~~state the date of issuance, the kind of property, produce, commodity, or article weighed, the name of the declared owner or agent of the owner or of the consignee of the material~~

~~weighed, the accurate weight of the material weighed, the means by which the material was being transported at the time it was weighed, and such other available information as may be necessary to distinguish or identify the property, produce, commodity, or article from others of like kind. Such weight certificate, when so made and properly signed and sealed, shall be prima facie evidence of the accuracy of the weights measurements shown.~~

#### SECTION 11. WEIGHT CERTIFICATE: EXECUTION, REQUIREMENTS

A licensed public weighmaster shall not enter on a weight certificate issued by him or her any weight measurement values but such as he or she has personally determined, and shall make no entries on a weight certificate issued by some other person. A weight certificate shall be so prepared as to show clearly that ~~weight or weights~~ measurements were actually determined.

If the certificate form provides for the entry of gross, tare, and net weights, in any case in which only the gross, the tare, or the net weight is determined by the weighmaster, he or she shall strike through or otherwise cancel the printed entries for the weights not determined or computed. If gross and tare weights are shown on a weight certificate and both of these were not determined on the same scale and on the day for which the certificate is dated, the weighmaster shall identify on the certificate the scale used for determining each such weight and the date of each such determination.

#### SECTION 12. SCALE EQUIPMENT USED: TYPE, TEST

When making a weight determination measurement as provided for by this Act, a licensed public weighmaster shall use a weighing device that is of a suitable type, meeting all requirements of National Bureau of Standards Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices," ~~suitable for the weighing of the amount and kind of material to be weighed and, that has been examined, tested and approved for use by a weights and measures officer of this State. within a period of 12 months immediately preceding the date of the weighing.~~

#### SECTION 13. ~~SCALE USED: CAPACITY, PLATFORM SIZE, ONE-DRAFT WEIGHING~~

~~A licensed public weighmaster shall not use any scale to weigh a load the value of which exceeds the nominal or rated capacity of the scale. -- When the gross or tare weight of any vehicle or combination of vehicles is to be determined, the weighing shall be performed upon a scale having a platform of sufficient size to accommodate such vehicle or combination of vehicles fully, completely, and as one entire unit. -- If a combination of vehicles must be broken into separate units in order to be weighed as prescribed herein, each such separate unit shall be entirely disconnected before weighing and a separate weight certificate shall be issued for each such separate unit.~~

#### SECTION 14 13. COPIES OF WEIGHT CERTIFICATES

A licensed public weighmaster shall keep and preserve for the ~~at least one year, or for such longer period as may be specified~~ in the regulations authorized to be issued for the enforcement of this Act, a legible ~~carbon~~ copy of each weight certificate issued by him or her, which copies shall be open at all reasonable times for inspection by any weights and measures officer of this State.

#### SECTION 15 14. RECIPROCAL ACCEPTANCE OF WEIGHT CERTIFICATES

Whenever in any other State that licenses public weighmasters, there is statutory authority for the recognition and acceptance of the weight certificates issued by licensed weighmasters of this State, the director of this State is authorized to recognize and accept the weight certificates of such other State.

#### SECTION 16 15. OPTIONAL LICENSING

The following persons shall not be required, but shall be permitted, to obtain licenses as licensed public weighmasters: (1) a law enforcement or weights and measures officer, or other qualified employee of a state, city, or county agency or institution when acting within the scope of his official duties; (2) a person weighing property, produce, commodities, or articles that he or his employer, if any, is either buying or selling; and (3) a person weighing property, produce, commodities, or articles in conformity with the requirements of Federal statutes or the statutes of this State relative to warehousemen or processors.

#### SECTION 17. ~~PROHIBITED ACTS~~

~~No person shall assume the title of licensed public weighmaster, or any title of similar import, perform the duties or acts to be performed by a licensed public weighmaster under this Act, hold himself or herself out as a licensed public weighmaster, issue any weight certificate, ticket, memorandum, or statement for which a fee is charged, or engage in full-time or part-time business of public weighing, unless he or she holds a valid license as a licensed public weighmaster. - "Public weighing," as used in this section, shall mean the weighing for any person, upon request, of property, produce, commodities, or articles other than those that the weigher or his employer, if any, is either buying or selling.~~

#### SECTION 18 16. SUSPENSION AND REVOCATION OF LICENSE

The director is authorized to suspend or revoke the license of any licensed public weighmaster (1) when he or she is satisfied, after a hearing upon 10 days' notice to the licensee, that the said licensee has violated any provision of this Act or of any valid regulation of the director affecting licensed public weighmasters, or (2) when a licensed public weighmaster has been convicted in any court of competent jurisdiction of violating any provision of this Act or of any regulation issued under authority of this Act, or (3) convicted of any felony.

#### SECTION 19 17. OFFENSES AND CIVIL PENALTIES

Any person who, by himself, by his servant or agent, or as the servant or agent of another person commits any of the acts enumerated below shall be subject to a civil penalty of not more than \$ \_\_\_\_\_ for each day of violation.



It is a violation for any person to:

- (1) use any device not meeting National Bureau of Standards Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices";
- (2) operate devices not in accordance with applicable National Bureau of Standards Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices" requirements;
- (3) falsely certify any gross, tare, or net weight or measure required by the Act to be on the certificate;
- (4) refuse to weigh or measure any article or thing which it is his duty to weigh or refuse to state in any certificate anything required to be therein;
- (5) hinder or obstruct in any way the director or his authorized agent in the performance of the director's official duties under this article;
- (6) assume the title of licensed public weighmaster, or any title of similar import, without a valid license;
- (7) perform the duties or acts to be performed by a licensed public weighmaster without a valid license;
- (8) hold himself or herself out as a licensed public weighmaster without a valid license;
- (9) issue any certificate, ticket, memorandum, or statement for which a fee is charged without a valid license;
- (10) engage in full-time or part-time business of measuring for hire without a valid license;
- (11) violate any provision of this Act or any regulation promulgated under this Act for which a specific penalty has not been prescribed.

Any civil penalty collected under this Act shall be transmitted to the state treasurer, who shall credit the same to the general fund. Penalties shall be determined by the director or his designee and may be collected by the department by action instituted in a court of competent jurisdiction for collection of such penalty. In determining the amount of any civil penalty to be assessed, the director shall consider any relevant factors. The final decision of the director or his designee shall be subject to judicial review. In the event that such an action is instituted for the collection of such penalty, the court may consider the appropriateness of the amount of the penalty, if such issue is raised by the party against whom the penalty was assessed.

~~Any person who requests a licensed public weighmaster to weigh any property, produce, commodity, or article falsely or incorrectly, or who requests a false or incorrect weight certificate, or any person who issued a weight certificate simulating the weight certificate prescribed in this Act and who is not a licensed public weighmaster, shall be guilty of a misdemeanor and upon conviction for the first offense shall be punished by a fine in any sum not less than twenty-five dollars or more than one hundred dollars; and upon a second or subsequent conviction such person shall be punished by a fine in any sum not less than one hundred dollars or more than five hundred dollars, or by imprisonment for not less than thirty days or more than ninety days, or by both such fine and imprisonment.~~

## **SECTION 20 18. OFFENSES AND CRIMINAL PENALTIES: MALFEASANCE**

Any person who

- (1) ~~Any licensed public weighmaster who falsifies a weight certificate, or~~
- (2) ~~who delegates his authority to any person not licensed as a licensed public weighmaster, or~~

- (3) who preseals a weight certificate with his official seal before performing the act of weighing,
- (4) requests a public weighmaster to weigh any property, produce, commodity, or article falsely or incorrectly;
- (5) requests a false or incorrect certificate;
- (6) issues a certificate simulating the certificate in the Act who is not a licensed public weighmaster

shall be guilty of a misdemeanor and upon conviction shall be punished by a fine in any sum not less than \$ fifty dollars - \$----- ~~or more than five hundred dollars~~ or by imprisonment for not less than thirty days or more than ninety days, or by both such fine and imprisonment.

The director shall inform the district attorney of the proper district of any criminal violation of this Act. It is the duty of each district attorney to whom the director presents satisfactory evidence of any violation of this Act to cause appropriate proceedings to be commenced and prosecuted in a court of competent jurisdiction. If this district attorney fails to so act within a reasonable time, the director may notify and be represented by the attorney general.

#### SECTION 20 19. RESTRAINING ORDERS AND INJUNCTIONS

If any person fails to comply with any provision of this Act or any regulation promulgated under this Act, the director may request the district attorney for the judicial district in which the alleged violation exists or the attorney general to bring, and if so requested it shall be the duty of such district attorney or the attorney general to bring, a suit for a temporary restraining order, preliminary injunction, or permanent injunction to prevent any further or continued violation.

Actions brought under this section shall be brought in the district or county court where the violation occurs. The institution of such injunction proceeding shall confer upon such court exclusive jurisdiction to determine finally the subject matter of the proceeding; except that the exclusive jurisdiction of the court shall apply only to such injunctive proceeding and shall not preclude assessment of civil penalties or any other authorized enforcement action.

#### SECTION 21. ~~OFFENSES AND PENALTIES-GENERAL~~

~~Any person who violates any provision of this Act or any rule or regulation promulgated pursuant thereto for which no specific penalty has been provided shall be guilty of a misdemeanor and upon conviction shall be punished by a fine in any amount not less than twenty-five dollars or more than one hundred dollars.~~

#### SECTION 22 20. VALIDITY OF PROSECUTIONS

Prosecutions for violation of any provision of this Act are declared to be valid and proper notwithstanding the existence of any other valid general or specific Act of this State dealing with matters that may be the same as or similar to those covered by this Act.



**SECTION 23 21. SEPARABILITY PROVISION**

If any provision of this Act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, the constitutionality of the remainder of the Act and the applicability thereof to other persons and circumstances shall not be affected thereby.

**SECTION 24 22. REPEAL OF CONFLICTING LAWS**

All laws and parts of laws contrary to or inconsistent with the provisions of this Act, and specifically \_\_\_\_\_, are repealed insofar as they might operate in the future; but as to offenses committed, liabilities incurred, and claims now existing thereunder, the existing law shall remain in full force and effect.

**SECTION 25 23. CITATION**

This Act may be cited as the "Weighmaster Act of \_\_\_\_\_."

**SECTION 26 24. EFFECTIVE DATE**

This Act shall become effective on \_\_\_\_\_.

## APPENDIX C

### Draft Test Method for Determining the Net Contents of Packaged Fresh Oysters Labeled by Volume

Packaged fresh oysters removed from the shell are required to be labeled by volume, for example, "8 fl oz." In addition, the maximum amount of free liquid is permitted to be 15% by weight. Testing the quantity of contents of fresh oysters, therefore, requires a determination of total volume, total weight of solids and liquid, and the weight of the free liquid only.

Ordinarily, the package contents of a package labeled by fluid volume can be poured into an inspector's field flask to determine the fluid volume (with an appropriate correction given for clingage remaining in the package). Oysters, however, will not fit down the necks of the smaller field flasks. Therefore, the package net volume is determined by measuring the volume of water delivered to the package container when filled to the same level as the original oyster contents. Determining the amount of free liquid requires draining the oysters and weighing the free liquid drained away. Worksheets are provided with the following method.

#### Equipment

- Small capacity package testing scale
- Depth gage
- Bubble level
- Field flasks and graduate
- No. 8, 8-inch U.S. Standard sieve and receiving pan
- Rubber spatula
- Stopwatch

#### Procedure

Every package in the sample must be opened. The following steps apply to each package.

1. Gross weigh the package. Record it on a worksheet.
2. Set the package container on a level surface. Open container. Use depth gage to determine the level of fill. Lock depth gage. Mark location of gage on the package.
3. Weigh a dry 8-inch receiving pan. Record it on the worksheet. Set sieve over receiving pan.
4. Empty contents from package container onto sieve. Do not shake. Tip the sieve slightly to help it drain. Time drain for 2 minutes. Remove sieve with oysters. A mucous is often associated with the oysters and will not go through the sieve. This is natural. Do not force the mucous through the sieve.

5. Weigh the receiving pan and liquid. Record in d. Subtract the weight of the dry receiving pan from the weight of pan and liquid to obtain the weight of free liquid. Record in f.
6. Wash and wipe the package container (as necessary) and weigh it dry. Record weight in b. This is the tare weight of the package. Subtract the tare weight recorded in b from the gross weight recorded in a to obtain the total weight of the oysters and liquid. Record in c.

$$\text{Percent of free liquid by weight} = \frac{\text{weight of free liquid}}{\text{weight of oysters + liquid}} \times 100$$

Record in g.

7. Set up depth gage on dry package container exactly as in step 2.
8. Deliver water from flasks and graduate as needed to reestablish the level of fill in step 2. Record all volumes in part II of the worksheet in h through k. Sum all volumes. This is the actual net volume for that package.

## Worksheet for Determining Net Volume of Oysters and Percent of Free Liquid

### I. Amount of Free Liquid

a. Package gross weight	
b. Package tare weight	
c. Weight of oysters and liquid = a - b =	
d. Weight of receiving pan and drained liquid	
e. Weight of dry receiving pan	
f. Weight of free liquid = d - e =	
g. Percentage of free liquid = $\frac{f}{c} \times 100 =$	

### II. Net Volume

Establish the Level of Fill of package containing oysters using depth gage.  
 Reestablish the Level of Fill using water and depth gage set to same depth as oyster liquid level.  
 Record below the amount(s) of water needed to reestablish liquid level.

h. Flask size	
i. Flask size	
j. Graduate	
k. Graduate	
l. TOTAL VOLUME = Sum all volumes recorded above =	

## APPENDIX D

### Draft Test Method for Compressed Gases

for inclusion into Handbook 133

(This is a draft for reading purposes only. Do not use these procedures.)

- 4.6.4. Method D: Determining the Volume of Compressed Gas in Cylinders. these procedures are for industrial compressed gas. The class of specialty gases, that includes instrument calibration gases and toxic gases, is sold by contract between the buyer and seller on a per cylinder basis and not by net contents.

#### A. Equipment

1. Scale, calibrated weights, and ramp.
2. Two (2) calibrated precision bourdon tube gages or any other approved laboratory-type pressure-measuring device that can be accurately read within plus or minus 5 psi. A gage having scale increments of 25 psi or smaller shall be considered as satisfactory for reading within plus or minus 5 psi. The range of both gages shall be a minimum of 0 to 5000 pounds per square inch when testing cylinders with standard industrial cylinder valve connections. Standard industrial cylinder connections are those connections listed in CGA Standard V-1, Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections,<sup>1</sup> for use with gas pressures up to 3000 psig (20 680 k Pa). For testing cylinders with cylinder valve connections rated for over 3000 psig, the test gage and its inlet connection must be rated at 2000 psig over the maximum pressure that the connection is rated for in CGA V-1. (Note that there are standard high pressure industrial connections on the market that are being used up to their maximum pressure of 7500 psig.)
3. An approved and calibrated electronic temperature measuring device or three calibrated mercury-in-glass thermometers having either a digital readout or scale division of no more than 1 degree. The electronic device equipped with a surface temperature sensor is preferred over a mercury-in-glass thermometer because of its shorter response time.
4. Safety glasses.
5. 12" adjustable wrench.

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<sup>1</sup>"Standard For Compressed Gas Cylinder Valve Outlet and Inlet Connections," Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.



6. Various fittings and adapters.

B. Safety Warnings

1. The inspector must have a thorough knowledge of the procedure, with emphasis on safety precautions, before attempting any tests. Charts referred to in the procedure should not be furnished to inspectors until the necessary training has been completed.
2. The inspector must be extremely careful with all gases since some react violently when mixed or when coming in contact with other substances. For example, oxygen reacts violently when it comes in contact with hydrocarbons.
3. Always wear safety glasses when testing cylinders by the temperature-pressure method.
4. Always place the protective cap on the cylinder, when moving it.
5. When a cylinder valve is opened to measure the internal pressure, position your body away from the pressure gage blowout plug or in front of the gage if the gage has a solid cast front case. A bourdon tube that ruptures can inflict serious bodily injuries from gas pressure or fragments of metal.
6. Open all valves slowly. A failure of the gage or other ancillary equipment can result in injuries to nearby persons. Remember: high gas pressure can propel objects with great force. Gas ejected under pressure can also cause serious bodily injuries if someone is too close during release of pressure.
7. One of the gages shall be reserved for testing oxygen only and shall be prominently labeled "For Oxygen Use Only." See 4.6.4. (A) 2.
8. The other gage may be used for testing a variety of gases if they are compatible with one another.
9. Special precautions must be observed with flammable gas in cylinders, in addition to the several precautions necessary for the safe handling of any compressed gas in cylinders.

It is vital to note that the first precaution differs from the usual safe procedure. Contrary to general practice with other gas cylinders, do not "crack" cylinder valves before connecting them to a regulator or manifold. This is extremely important for both hydrogen and acetylene.

10. Additional precautions necessary for personal safety are described in the Handbook of Compressed Gases. All personnel testing compressed gases should have this manual for reference and be familiar with its contents.

C. Procedure

Containers must be labeled in compliance with NBS Handbook 130 requirements. Containers which do not bear a labeled statement of net quantity will be marked "off sale" until the containers are brought into compliance.

1. Testing by Weight

- (a) Note tare weight stamped on cylinders.
- (b) Place cylinder on scale.
- (c) Remove protective cap. The cap is not included in the tare weight.
- (d) Weigh the cylinder and determine net weight. Compare actual net weight with labeled net weight of volume.
- (e) The acetone in acetylene cylinders is included in the tare weight of the cylinder. Therefore, as acetylene is withdrawn from the cylinder, some acetone will also be withdrawn, changing the tare weight. Most producers will replace acetone in the cylinder at the time the cylinder is refilled, but some producers do not replace the acetone until it reaches a given level. In this latter situation, the refilling plant must note the actual tare weight of the cylinder and show it on the tag containing the net content statement.
- (f) Refer to tables for acetylene gas if necessary.

2. Volumetric Testing

- (a) Thermometers or temperature sensors used for measuring temperatures during testing of cylinder gases shall be in contact with the outside surface of the cylinder approximately at the midpoint of the longitudinal axis.
- (b) The cylinders to be tested for quantity shall be taken from a lot that has had time to stabilize at the ambient temperature. The cylinders in the outside row should not be selected for testing since they may be of a different temperature. The temperature used shall be an average taken from three cylinders selected at random. Cylinders that are exposed to heat or sunlight shall not be chosen for test unless an electronic heat sensor is used to measure the temperature of each cylinder. This is the preferred method of measuring the cylinder temperature because there can be differences in temperature from cylinder to cylinder, and the electronic sensors will stabilize within a few seconds. It is not practical to measure the temperature of each cylinder with a mercury-in-glass thermometer due to the time required for the thermometer to stabilize.

- (c) Measure the pressure of each cylinder in the sample selected.
- (d) Determine the temperature of the cylinders in the sample selected.
- (e) Determine the cylinder nominal capacity from cylinder data table.
- (f) Refer to NBS Tech Note 1079 and compute the actual net content<sup>2</sup>.

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<sup>2</sup>"NBS Technical Note 1079," U.S. Department of Standards, National Bureau of Standards, Gaithersburg, MD 20899.

## APPENDIX E

### Test Procedures for Meat & Poultry Packaged in Federally-Inspected Plants

The following test procedure is recommended for inclusion in Handbook 133.

#### 3.18. MEAT AND POULTRY FROM FEDERALLY-INSPECTED PLANTS

##### 3.18.1. Background for Administrator and Inspector

These test procedures are for meat and poultry coming from Federally-inspected plants. If inspectors check these packages at wholesale or retail, and use Category A sampling plans from H-133 and unused or dried used tare (see section 3.18.3.5. for definition), the packages tested are either in or out of compliance. There is no gray area. If a jurisdiction uses wet tare (see section 3.18.3.5., definition), there is a "gray" or "no-decision" area. The gray area is not a tolerance. If packages are found in the gray or no-decision area, they neither automatically pass nor fail the test. If lots are tested and found inside the gray area, they are not necessarily in compliance. The jurisdiction will have to do more work to find out the final status of the lot.

The size of the gray area is defined as a percentage of the labeled weight that extends downward from the labeled weight.

##### a. Enforcement action inside and outside the gray area

The overall objective is to test packages as closely as possible to a routine test. However, one difference will immediately be apparent:

Category A sampling procedures must be employed at retail or wholesale locations when testing packages put up in a Federally-inspected plant. (This is because something close to a Category B test has already been run on the packages at the plant level.)

Category B sampling procedures may be used when testing at the packaging plant.

##### b. "Dry Tare" Jurisdictions

For jurisdictions that normally utilized unused tare to test meat and poultry packaged at a retail store, it will be necessary to simulate unused tare for packages from Federally-inspected plants by drying out absorbent materials (if any) comprising the used tare and to determine a "dried used tare."

No additional information will be needed other than the results of a Category A test using "dried used tare" before taking enforcement action on lots.

**c. "Wet-Tare" Jurisdictions**

For jurisdictions that normally use wet tare, if the package lots are found short weight with wet tare tests, but fall in the "gray area," it is necessary to collect additional information to determine whether or not the lot complies with net weight requirements.

If the package lots are found short weight using a Category A sampling plan and wet tare, it will first be necessary to determine whether the lot is inside or outside the gray area. If the lot falls in the gray area, additional information will have to be collected before reaching a final determination whether the lot is in or out of compliance. Of course, nothing additional will be needed for lots that fall outside the gray area. Appropriate enforcement should be taken on packages found short weight and outside the gray area.

A "hold" or a "stop sale" order should be put on packages found short weight, but inside the gray area, until their status can be determined. If this is not possible, the strongest legal remedy should be sought if the product cannot be held and subsequent tests or information indicates that the lot is out of compliance.

**d. Which packages to consider as part of the lot being tested**

Ordinarily, an inspector taking a sample from retail, will record lot codes but will not select the lot for test by sorting the packages by lot code. He or she will simply select a sample from all packages of the same brand and style and size on the shelf or in the stock room. If short weight is found and the results are in the gray area (wet tare only), follow-up investigation requires sorting the lot codes at this point.

**e. Category A sampling plans must be used for all tests**

See section 3.18.3. for details. The discussion below is based on using these procedures and on recording the package weights as "package errors" - how much and in what direction the actual package weight differs from the labeled weight. Thus, if a package labeled 2 lb actually weighs 2.010 lb, its package error is +0.010 lb. The same situation holds for average package weights. If the average of 10 package weights is 1.994 lb, the average package error is  $(1.994 - 2.000 \text{ lb}) = -0.006 \text{ lb}$ .

**f. Package lots must meet the average requirement and the individual requirement**

When checking packages not subject to possible moisture loss, using H-133 Category A sampling plans, there are two requirements for the packages:

- (1) The average net weight of the sample must equal or exceed the labeled net weight minus an adjustment factor called T. T represents the possible deviation between the sample average and the actual lot average.

See the general discussion of T in NCWM Training Module 10.



If a jurisdiction applies either unused or used dried tare on meat and poultry packages, this is sufficient to determine whether the average requirement has been met. See Figure 3-15.

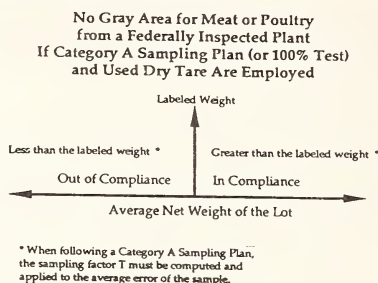


Figure 3-15.

If a jurisdiction uses wet tare, an amount defined by the gray area must be considered before determining noncompliance of the lot under test without further information or data collection. See Figure 3-16.

The size of the gray area has been set at 3% of the average labeled weight for raw, fresh poultry and 2-1/2% of the labeled weight for franks and hot dogs (whether made from meat or poultry).

(2) The number of packages that may fall below the MAV is specified in Category A sampling plans according to the sample size. Ordinarily, the inspector uses Table 2-8 to look up the MAV for packages labeled by weight.

USDA Meat and Poultry Inspection uses a different set of MAV's for products under its supervision. These are given in Table 2-12 in H-133 and in the Model Agreement between States and the USDA. Use Table 2-12 for all products coming from a Federally-inspected plant, instead of Table 2-8.

The size of the gray area must be added to the individual package limits specified in Table 2-12 when the jurisdiction uses wet tare.

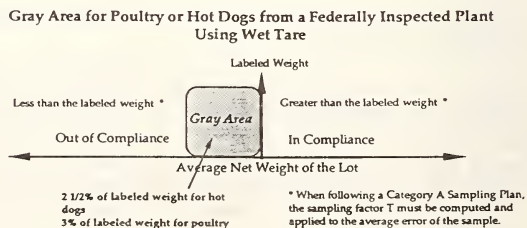


Figure 3-16.

**g. What to do when the lot is in the gray area ("Wet Tare" Jurisdictions Only)**

Contact the USDA Regional Director or the Inspector-in-charge at the packaging plant (See Section 3.18.3.h) to determine what information (either USDA's or the plant's) is available at the plant to clarify the status of the lot in question. General Guidelines are given in section 3.18.3.h.

According to the location of the plant, either visit the plant, or call and ask the weights and measures authorities where the plant is located to visit and test.

**3.18.2. Types of Products**

**(1) Bacon**

There should be no free-flowing liquid in packaged bacon (otherwise the product is subquality). Wet tare and dried used tare are equivalent. Wipe dry all packaging materials of fat and clinging moisture before weighing tare. There is no gray area for bacon.

**(2) Fresh Sausage & Luncheon Meats**

There is no gray area for fresh sausage or luncheon meats (for example, bologna). Carefully clean and wipe all tare materials. Wet tare and dried used tare are equivalent.

**(3) Franks/Hot Dogs**

A gray area of 2-1/2% of the labeled weight is to be applied when wet tare tests are conducted.

**(4) Fresh Poultry**

A gray area of 3% of the average net weight is to be applied when wet tare tests are conducted.

**3.18.3. Procedure**

**a. Field Equipment**

Use Scales and Weights recommended in Section 3.1.

**b. Report Forms**

Use either the Standard Pack-Weight Only-Report Form (page A-2) or the Random Pack Report Form (p. A-3). Record the official establishment number from the USDA logo in the space provided underneath name and address.

**c. Selection of Lots**

Refer to Section 2.3. for defining and selecting the inspection lot. The lot codes are the packer's own identifying marks, not the universal product code (UPC). In many instances, the lot code may be represented by a "pull" or "sell by" date. Record the lot code on the report form.

d. Sample Size

Select the sample according to the size of the inspection lot following a Category A sampling plan (Table 2-2, p. B-3). Do not sort random-pack packages from lightest to heaviest as recommended in section 3.8.1., step 2, page 3-20.

e. Tare

Select the tare sample as given in Table 2-2.

(1) Unused or Dried Used Tare

Unused tare material is rarely available at retail or wholesale locations for package lots packaged at Federally-inspected plants. The tare weights printed on the shipping containers may not be accurate. It is therefore necessary for the inspector to reconstruct an unused tare weight by drying the used tare and weighing it. The following technique should be followed to get "dried used tare":

A fresh poultry package will be used as the example.

Shrink Wrap: Open package shrink wrap, remove wrinkles from heat-seal area as much as possible, and wipe or pat dry with paper toweling or other suitable material.

Tray: If tray is foam or plastic, rinse tray and wipe or pat dry. If tray is paper or cardboard, pat dry between sheets of toweling and lay tray on heating element of prepack scale or heat in microwave oven to dry. Depending on the power of the oven, total times between 2 and 5 minutes may be necessary. Frequent short bursts of power (30-sec intervals), checking after each cycle, are better than a single 5-minute run. (The trays can burn if too long a cycle is used to dry.) Let the tray cool and become dry to the touch before final weighing.

Soaker Pad: Many soaker pads are composed of plastic sheets laminated with fibrous paper tissue. Peel the plastic sheeting away from the tissue (if possible), press the tissue between sheets of paper toweling, and dry the tissue on the heating element of the scale or in a microwave as described above for a paper tray. Wipe or pat the plastic sheeting dry and weigh it with the cooled tissue part, tray, shrink wrap and label. Do not attempt to rinse out soaker pads -- they will often disintegrate when loaded with water.

Depending on the surface area of the microwave oven tray and the size of the soaker pads, do not load more than two to five tare pads in a microwave at one time and do not stack them. Stacking or loading too many pads at one time will take more oven time and power, increasing the possibility of burning or charring the pads.

**What a package should weigh using unused or dried used tare**

Add the average "dried" tare weight to the labeled net weight to determine what the package is supposed to weigh - the "nominal gross weight."

average tare weight + labeled weight = nominal gross weight

**Package errors using unused or dried used tare**

Use the package checking scale to compare the packages in the sample with the nominal gross weight. A package that weighs more than the nominal gross weight is overweight and has a "plus package error;" a package that weighs less than this is underweight and has a "minus package error."

package error = package gross weight - nominal gross weight

Go to section 3.18.3.f. on the average requirement.

**(2) Wet Tare**

**Determining the Net Weight**

All free liquid is considered part of the tare. To avoid destroying too many packages:

- (1) gross weigh two packages opened for tare,
- (2) weigh solids inside,
- (3) get wet tare by subtracting solids weight from gross weight,
- (4) average wet tare weight + labeled weight = nominal gross weight.

Use the alternative tare procedure (Section 2.11.4.) to determine whether to open more packages (i.e., whether the tare is too variable).

(Packages opened for a wet tare test may be rewrapped by the supermarket as long as the USDA logo does not go on the package. The supermarket may wish to contact the original packager if it intends to leave the brand name of the product on it when repackaging.)

**Determining Package Errors**

**If individual package net weights were measured:**

Package error = package net weight - labeled net weight

A package that weighs more than the labeled weight is overweight and has a "plus package error." A package that weighs less than the labeled weight is underweight and has a "minus package error."

If an average tare weight and nominal gross weight were determined:

Package error = package gross weight - nominal gross weight

**f. The Average Requirement**

Compute the average error for the sample. Sum all individual package errors

and divide by the number of packages in the sample. Record the average package error in box 18 on the standard pack report form or box 20 on page 2 of the random pack report form.

If the average error is zero or plus, the lot complies with the average requirement.

If the average error is minus, first compute T (see Section 2.7. in this handbook and Chapter 6 of the Inspector's Manual in Module 10 for further instructions if this procedure is unfamiliar to you). Record T on the report form, and continue with subsections (1), (2), or (3) below as appropriate.

(1) Unused or Dried Used Tare

With dried used tare, if the average minus error is larger than T, the lot does not comply with the average requirement; enforcement action should be taken. Also, follow the process outlined in the Section 3.18.3.h.

(2) Wet Tare - Fresh Poultry

- (a) Compute 3% of the average labeled weight.

average labeled weight  $\times$  0.03 = gray area

There is space below column 8 of the Random Pack Report Form to compute the average labeled weight of the sample.

- (b) Record this in comments section as "gray area"
- (c) If T was computed, add the gray area to T, calculated and recorded on page 2 of the random pack report form. Record in remarks section as "gray area + T"
- (d) Compare value in box 20 with "gray area + T"
- (e) If the value in box 20 is larger than the "gray area + T", the lot fails to comply. (Box 20 will always be a minus value - so disregard the sign when comparing with gray area + T). If the value in box 20 is between T and the gray area + T, go to section 3.18.3.8. If the value in box 20 is less than T, the lot complies.

(3) Wet Tare - Hot Dogs or Franks

- (a) Compute 2 1/2 % of the labeled net weight recorded in box 1 of the standard pack report form.

(Value in box 1)  $\times$  0.025 = gray area (lb or oz)

Unless the lot is so small that the inspector is testing all packages in the lot (100% test). If this is the case, and the average error is minus, the lot fails if it is a dried used tare test; the lot may be in the gray area if it is a wet tare test.



- (b) Convert to dimensionless units by dividing by the unit of measure in box 2.

$$\frac{\text{gray area (lb or oz)}}{\text{box 2}} = \text{gray area (dimensionless units)}$$

Record this in comments section as "gray area."

- (c) Continue with (c), (d), and (e) as for Subsection (2) Wet Tare-Fresh Poultry.

#### **g. The Individual Package Requirement**

Table 2-12 gives the limits for individual package errors for packages produced at Federally-inspected plants. Use this table instead of Table 2-8 for looking up the MAV. The number of individual minus package errors permitted to be larger than the "lower limit for individual weights" (see the righthand column of this table) is given in Table 2-2 (p. B-3). Convert this value (or values if a random pack lot falls between groups) to dimensionless units and record on the report form.

When conducting a dried used tare test, compare the value(s) from Table 2-12 (converted to dimensionless units) with minus package errors. If the number of minus package errors that exceed the limits of Table 2-12 is more than allowed by the Category A plan being followed, the lot does not comply.

#### **Wet Tare**

When conducting a wet tare test on hot dogs or fresh poultry, the size of the gray area must be added to Table 2-12 value(s) before counting the number of packages that exceed the MAV. In section 3.18.3.f. the size of the gray area (in dimensionless units) was recorded in the comments area of the report form. The values from Table 2-12 are recorded in boxes 10 and 11 on the random pack report form and box 4 on the standard pack report form. Add the size of the gray area to the value(s) from Table 2-12 (converted to dimensionless units) before comparing with the minus package errors.

If the number of minus package errors that are greater than (Table 2-12 + the gray area) exceeds the number permitted in Category A plans, the lot does not comply. If minus package errors fall between the Table 2-12 value and (Table 2-12 + the gray area), they place the lot in the gray area if the number of these types of minus package errors exceeds the number permitted in Category A plans.

#### **h. What to Do When the Lot Is in the Gray Area**

Although the following discussion is intended primarily for those jurisdictions using wet tare for meat and poultry, any jurisdiction is encouraged to follow these procedures when product from Federally-inspected product fails to comply with net weight tests.

The "Meat and Poultry Inspection Directory," is available from the locations listed in the Memorandum of Understanding. (See Appendix D of the Executive Report.) Meat and Poultry packaging plants are listed by "establishment number." Use the establishment number on the package to look up the location and tele-

phone number of the plant. Sometimes a separate number is provided for the USDA Inspector-in-charge. If the establishment number is not listed in this directory (since new businesses may have been established after the directory was published and are not listed in the directory), call the Regional Office to get the telephone number(s) of the plant and the appropriate USDA official for the plant in question.

Contact the appropriate USDA official to determine what information is available on the lot in question (see subsection (1) below). If a lot of hot dogs or fresh poultry has been tested using wet tare, any average package error that is minus and larger than T may place the lot in the gray area.

**(1) Further Information**

Ask the USDA official:

- (a) Whether the plant is operating under a "Total or Partial Quality Control Program"(TQC or PQC).

Some plants operate under a Federally approved "Total or Partial Quality Control Program." If such a program is in place, records will be available on the lot in question, but will be maintained by the establishment, not by USDA. If the establishment is not operating under a TQC or PQC Program, USDA may or may not have tested the lot in question. The USDA official will be able to tell you what information he has, as compared with information that may be available from the plant personnel.

- (b) What information is available from USDA concerning the particular lot in question.
- How many packages are tested at what time intervals;
  - How many packages are produced in that time interval;
  - What criteria are employed to decide when adjustments to the net weight are required;
  - What the net weight checks on the lot in question were;
  - What adjustments were made to the target weight.

If USDA has data on the specific lot in question or if there is an approved TQC or PQC program producing data on the lot, this data may serve to substantiate that the lot complied with net weight requirements when it left the plant. If data on the specific lot in question was not collected by USDA or under an approved QC program, the weights and measures test results are the only regulatory agency data on the lot. In this instance, the weights and measures authority should take whatever action he deems appropriate; USDA has no data to dispute the weights and measures findings.

- (c) What scale maintenance and testing program is in place in the plant.

If the Memorandum of Understanding is signed by a state, it requires that scales meet H-44 requirements, including suitability of equipment.

- (d) What tare verification system is in place in the plant, including how the tare is determined, how often it is monitored, how it is verified when new tare materials are delivered.

- (e) What kind of net weight verification or testing (and how often) does the USDA Inspector conduct such tests.
- (f) Who are the establishment personnel to contact to review establishment-maintained records on the lot in question.

**(2) Test Packages and Scales at the Packaging Plant**

Optionally, make arrangements to visit the plant or call the weights and measures jurisdiction where the plant is located. Discuss the net weight control program with plant quality control personnel, check their scales (if possible), and test packages. Even though it is not possible to test the lot in question at the plant, it may be possible to establish confidence in plant process and weight control procedures.

Note the type of scales used to monitor the fill weights of the packages. Ask to test the scales. (This may be too disruptive during a production run.)

Take a sample of packages from the line or storage area and test them using H-133 Category B sampling procedures plus the Table 2-12 values for individual packages. Since you are at the packaging plant and no distribution has occurred, there is no gray area to consider at this point. Because of the large number of packages in the lot when testing at the plant, the sample size will usually be 30 packages. Ask the USDA inspector if he will conduct a test using his procedures and equipment on the same lot.

**(3) Other Optional Information Available from the Packer**

When testing at the packaging plant, this is the appropriate time (or it may be necessary to explore the issue by telephone) to get some optional information:

How many packages are produced in a single production run? How much of the plant's production does each lot code represent (a single line's run, 8 hours/24 hours production, etc.)?

What is the target weight for each label? How is this value set? (This will be considered confidential information.)

What scales or other measuring equipment and procedures are used to measure or control the package net weights (checkweighers; line supervisor weighs a package every hour, etc.)?

How quickly can adjustments be made to package fill targets that are found out of bounds?

How often are the scales tested; who does the testing (yearly service call; quality control supervisor on a daily basis, etc.)?

How does the plant determine the tare weight, how often does the plant change the tare weight, what does the plant do with tare information? (For example; actual tare unit used and changed whenever new shipment of tares sent; average weight to closest 0.01 lb is added to target weight; etc.)

Does the packager report different tare weights to different areas of his market? (For example: wet tare values, dry tare values, something in between) How are these determined?

What variation in package weights from the labeled declaration does the line or plant normally encounter? (Ask them to show you or send copies of their records. These records are proprietary and may be available only for viewing.)

What are the details of their PQC or TQC program if they are operating one?

REPORT OF THE  
COMMITTEE ON SPECIFICATIONS AND TOLERANCES

Kenneth S. Butcher, Chairman  
Program Manager, Weights and Measures Section  
State of Maryland

REFERENCE  
KEY NO.

300

INTRODUCTION

This is the Final Report of the Committee on Specifications and Tolerances for the 73rd Annual Meeting of the National Conference on Weights and Measures. The Report is based on the Interim Report offered in NCWM Publication 16 "Program and Committee Reports," the Addendum Sheets issued at the Meeting, and actions taken by the membership at the Meeting.

Table A identifies the items in the Report by Reference Key Number, Item Title, and Page Number. Table B lists the Appendices. The item numbers are those assigned in the Interim Meeting Agenda. Voting items are identified in this table in **boldface print**, as well as by the suffix "V." Information items are identified by the suffix "I." Withdrawn items are identified by the suffix "W." At the Annual Meeting, the Committee grouped the less controversial voting items into a "consent calendar." These are marked as "VC". Items marked with a "W" generally will be referred back to the regional weights and measures associations because they either need additional development, analysis, and input, or did not have sufficient support of the Committee to bring them before the NCWM. If a new item was added, it was assigned the next number in sequence to maintain a correlation between the Interim Meeting Agenda and the Report.

Much of the attached Report contains recommendations to revise or amend National Bureau of Standards (NBS) Handbook 44, 1988 Edition, "Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices. Proposed revisions to the handbook are shown in **bold face print** by ~~crossing-out~~ what is to be deleted, and underlining what is to be added. Entirely new paragraphs or sections proposed for addition to the handbook are designated as such and shown in **bold face print**.



**Table A**  
**REFERENCE KEY ITEMS AND INDEX**

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320-1	I	S.1.3. Manual Gross Weight Entries	240
320-2	I	S.2.3. Tare-Prepackaging Scales	240
320-3	I	S.2.3. Tare; Point-of-Sale Systems	240
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320-5A	V	S.6.7. Vehicle Scale Capacity and Section Capacity	242
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		<b>LIQUIFIED PETROLEUM GAS AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES CODE</b>	
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354	VC	Update for Electronic Taximeters	264
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Table B  
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App.	Title	Reference Key No.	Page
A	Revised Liquid-Measuring Devices Code	330-1	274
B	Report of the Technical Committee on National Type Evaluation - Measuring Industry Sector	330-9	295
C	Taximeters Code	354	299
D	California Requirements for Stage II Vapor Recovery	360-3	307

**ORDER OF PRESENTATION**

The report was presented to the membership as follows:

1. The Consent Calendar was presented.
2. Item 347-1 was removed from the Consent Calendar on request. This item was to be voted on individually but the Committee withdrew this item after discussion and prior to the vote.

Table C  
VOTING RESULTS

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
Consent Calendar	50	0	81	0	Passed
320-5A	50	0	88	0	Passed

**Table C (Continued)**  
**VOTING RESULTS**

Reference Key No.	House of State Representatives		House of Delegates		Results
	Yes	No	Yes	No	
320-5B	50	0	83	0	Passed
320-8	37	13	62	23	Passed
320-17	31	16	57	27	Passed
320-18A	48	1	71	3	Passed
320-18B	3	43	18	66	Failed
330-1A	50	0	80	0	Passed
347-1	No vote. Withdrawn by the Committee.				
356-1	50	0	80	0	Passed

**DETAILS OF ALL ITEMS**  
(In the order they appear in Table A)

**SECTION 1.10. GENERAL CODE**

**310-1 I G-S.6. MARKING, OPERATIONAL CONTROLS, INDICATIONS, AND FEATURES**

Clarification of the marking requirements was requested in response to interpretations that have been made through the National Type Evaluation Program (NTEP). The NTEP has distinguished between symbols visible only to the operator and symbols that are also visible to the customer. Consideration should also be given to establishing a list of accepted international symbols that may be used without further definition. Three symbols were adopted by the conference in 1985 as acceptable without further definition. Based on an OIML Preliminary Draft on graphic symbols, one of those symbols has a different meaning today than was originally presented.

NTEP currently requires that any international symbols visible to a customer, other than the three originally adopted, be defined by a legend on the device. The Committee believes that appropriate international symbols and the common symbols in use today in the United States should be accepted without further definition. Any other nonstandard symbols visible to the customer would then have to be defined by a legend.

The Committee wants to allow sufficient time for all interested parties to review this proposal before presenting it to the Conference for adoption. Manufacturers will need time to incorporate the appropriate key markings and legends on their equipment. Consequently, the Committee presents the following proposals for review by the regional weights and measures associations in the coming year.

The following changes are suggested for consideration.

Amend G-S.6. to read:








**G-S.6. MARKING, OPERATIONAL CONTROLS, INDICATIONS, AND FEATURES.**— All operational controls, indications, and features, including switches, lights, displays, pushbuttons, and other means, shall be clearly and definitely identified.

- (a) Keys or operator controls visible to a customer in a direct sale shall be marked with words or symbols that can be understood by the customer.
- (b) Keys or operator controls visible to and for use only by the operator shall be marked so that the function of the key is identified. Such key symbols and their functions shall be defined in the operator's manual or by legends on the device.

Add a user requirement to the General Code to read:

**G-UR.3.5. OPERATING INSTRUCTIONS AND PROCEDURES** - The operating instructions shall be readily available to the user, service technician, and weights and measures official at the place of installation. (Nonretroactive as of January 1, 1990)

The following international symbols, taken from the OIML Preliminary Draft on graphic symbols, are recommended for acceptance for use without further definition. These symbols would replace those adopted previously.

	Off (Power)		Center of zero indication
	On (Power)		Set tare
	Print		Verify tare
	Zero device		Clear tare

The proposed amendment is less restrictive than the current G-S.6., consequently the amendment need not be nonretroactive. If adopted by the NCWM in 1989, the international symbols listed above will not have to be defined by a legend on the device. Common symbols currently in use and accepted, e.g., G for gross weight, N for net weight, T for tare weight, C for clear, will still be accepted without definition. Symbols used to mark keys visible only to the device operator will not have to be defined on the device, but the operator's instruction manual will have to be available at the place of installation to be referenced by the user, the service technician, and the weights and measures official to determine the meaning of the symbols. Key symbols not included in the above list and visible to customers will have to be defined by a legend on the device.

The Committee recognizes that the enforcement of G-UR.3.5. will be difficult. However, it is often not possible to mark keys with sufficient words or symbols that fully explain the function of the keys. This user requirement implies that the operator's manual must be available to the enforcement official at the time of inspection. Since the operation of many devices is so complex that all features cannot be operated without some training, the availability of the instruction manual would permit the enforcement official to perform a complete inspection of the device.



### 310-2 I G-S.8. PROVISION FOR SEALING ELECTRONIC ADJUSTABLE COMPONENTS

The purpose of a security seal is to show whether or not someone has had access to the adjustment mechanism of the device since the last inspection or the last authorized adjustment. Additional forms of security that are available on electronic devices provide the same or better information as a physical security seal and should be allowed. One possible approach is to require that a device retain in memory the dates for the last several (perhaps 10) adjustments and maintain a count of the number of times the calibration mode has been accessed. Another possible form of security is a non-resettable counter of the calibration operations, with or without the dates of adjustment. The Committee is considering whether or not a physical security seal is needed if a system maintains a record of the calibrations by count and date. In any event, access to the calibration mode must be protected through a password or other means. To determine when and how frequently the device has been adjusted, the record of calibration must be readily displayed or printed for the enforcement official at the time of inspection and without disassembly of the device. If the device adjustment provides the capability to electronically store the calibration values (e.g., a meter calibration factor), perhaps this information should also be retained in memory as part of an "audit trail."

The Committee plans to present these changes for adoption in July 1989, allowing sufficient time for review by all interested parties. The proposed definition of "metrological characteristics" (see below) lists those that the Committee believes should be sealed. The list provides examples of the metrological characteristics to be covered by this definition, but is not all-inclusive.

The Committee requests that the following proposals be reviewed at meetings of the regional weights and measures associations.

Add a new paragraph G-S.9. to read:

**G-S.9. PROVISION FOR SEALING ELECTRONIC COMPONENTS THAT AFFECT METROLOGICAL CHARACTERISTICS.** - A device shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change can be made to any electronic mechanism that affects the metrological characteristics of the device. (Non-retroactive as of January 1, 1990)

Add a definition for metrological characteristics to read:

**Metrological characteristics.** Those indications, features, operations or mechanisms that affect the weighing or measurement functions or features for weights and measures regulation, such as the parameters for the automatic zero-setting mechanism, width of zero, display update rate, the settings for digital filtering, averaging time or number of readings for the display update, motion detection setting, the selection of measurement units when the selection is through an internal switch or set-up procedure, any adjustment for measurement accuracy, gallon to liter conversion, and the selection of the value of the quantity division.

## SECTION 2.20 SCALES CODE

### 320-1 I S.1.3. MANUAL GROSS WEIGHT ENTRIES

The capability to enter gross weight values manually presents a significant potential for fraud. NTEP addresses this problem on a case-by-case basis. The Committee recommends no action this year because more information is needed. There may be times when the use of this feature does not facilitate fraud, for example, when there is no load on a point-of-sale scale, when the cash register operator is voiding an item in a sale or giving a credit to a customer for returned product, or when using a prepackaging scale to generate standard weight labels for packages. On some electronic cash registers it is possible to manually enter quantity values to two decimal places with selectable measurement units, such as gallons, feet, and square yards. At other times this capability may be used fraudulently, for example, to print a fraudulent gross weight, or when an item is weighed on an illegal scale and a weight is entered manually to give the appearance of having been weighed on the commercial scale. The Committee was advised that this feature has been used in weigh-in/weigh-out operations for vehicles. The Committee believes that such an operation should have the capability for storing incoming weights in memory so that the manual entry of a gross weight is not necessary.

The Committee is considering whether or not adequate safeguards can be incorporated into a scale to prevent the facilitation of fraud by using this feature. One safeguard may require a clear statement on a receipt or weight ticket that the gross weight was entered manually. This will not resolve the issue if printers are not required with a scale.

The Committee is considering a proposal to prevent the fraudulent manual entry of gross weight. The Committee requests that the regional weights and measures associations study this issue and provide comments for consideration next year.

### 320-2 I S.2.3. TARE; PREPACKAGING SCALES

The Committee reviewed a proposal for prepackaging scales that would allow keyboard tare entries to divisions smaller than the displayed scale division. The proposal stated that increased package accuracy could be achieved if tare entries were not affected by the round-off to the nearest displayed scale division.

The Committee agrees with the concept, but does not support the proposal because other approaches are available for stores to improve the accuracy of their tare setting. For example, multi-range scales and scales with smaller scale divisions are available, although it is not known to what extent prepackaging scales have taken advantage of these possibilities. Prepackaging scales are not precluded from having smaller scale divisions or from being multi-range scales. The Committee believes that permitting keyboard tare entries to divisions less than the displayed resolution of the scale would create problems with determining the accuracy class of the scale, determining to what accuracy the tare feature must operate, and applying the proper tolerance to the device. Consequently, the Committee does not recommend any change to S.2.3.

### 320-3 I S.2.3. TARE; POINT-OF-SALE SYSTEMS

The Committee received a request to require that all point-of-sale systems receiving type evaluation after January 1, 1989 have fixed and percentage tare capability for bulk food items that are individually wrapped. Point-of-sale systems would then have to be able to take a fixed tare for the container plus a percentage of the weight of the commodity as tare for the individual wrappers on the commodity.

The Committee agrees that this feature would facilitate achievement of net weight when selling individually wrapped items from bulk. It is not needed on all point-of-sale systems, but must be available when a fixed and percentage tare is needed for a single weighing. Net weight is required by law and is specified in Handbook 44.

It is believed that requiring fixed and percentage tare capability for point-of-sale systems used to sell individually wrapped items from bulk will have a significant impact on the hardware and software used in point-of-sale systems and possibly in the computer software used by supermarkets to monitor their business operation. Time will be needed to incorporate this type of tare capability into point-of-sale systems.

The Committee does not recommend any action this year. However, it requests that the regional weights and measures associations study this issue and provide comments for consideration next year. To stimulate a review of this issue, the Committee suggests adding a sentence (part (d)) to S.2.3. as shown below.

### S.2.3. TARE.-

- (a) On any scale (except a monorail scale equipped with digital indications), the value of the tare division shall be equal to the value of the scale division. (Nonretroactive as of January 1, 1983)
- (b) The tare mechanism shall operate only in a backward direction (that is, in a direction of underregistration) with respect to the zero-load balance condition of the scale.
- (c) A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.

(Note: On a computing scale, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require a complete weighing operation, including tare, net, and gross weight determination.)  
(Nonretroactive as of January 1, 1983)

- (d) Point-of-sale systems used to weigh individually wrapped items from bulk shall be capable of taking both a fixed tare and a percentage tare for the commodity being weighed.  
(Nonretroactive as of January 1, 19\_\_)

### 320-4 VC S.2.2.2. BALANCE INDICATOR, EQUAL ARM SCALE

(This item was adopted.)

(This item was originally submitted as a change to S.3.1. which is why it is carried as agenda Item 320-4.)

A significant number of equal-arm scales without balance indicators are sold for direct sale applications. The Committee believes that the presence of a balance indicator on these balances would facilitate more accurate weighing by providing a reference point for both the operator and customer. The Committee also considered whether or not graduations should be required on either side of the balance graduation to facilitate the discrimination test on the scale. The Committee decided that the discrimination test can be performed

adequately without additional graduations.

The Committee recommends that a new paragraph S.2.2.2. be added on a nonretroactive basis to read:

**S.2.2.2. EQUAL-ARM SCALE.- An equal arm scale shall be equipped with a balance indicator. If the indicator and balance graduation are not in the same plane, the clearance between the indicator and the balance graduation shall be not more than 0.04 inch. (Nonretroactive as of January 1, 1989)**

#### 320-5A V S.6.7. VEHICLE SCALE CAPACITY AND SECTION CAPACITY

(This item was adopted.)

There is no uniform method for rating the nominal capacity of a vehicle scale based upon the section capacity. Some scale capacities are overstated by the manufacturer in terms of section or nominal capacity. Industry and enforcement officials believe there is a need to standardize the capacity rating of livestock and vehicle scales.

The SMA has developed a proposal which relates nominal capacity to a rated concentrated load capacity. The concentrated load capacity (abbreviated "CLC") is specified by the manufacturer to indicate the maximum concentrated load for which the weighbridge is designed.

The nominal capacity shall not exceed the concentrated load capacity times the quantity of the number of sections in the scale minus 0.5. As a formula this is stated as:

$$\text{Nominal Capacity} \leq \text{CLC} \times (N - 0.5)$$

where N = the number of sections in the scale.

This will limit the misrepresentation of capacities because the scale will have to perform accurately during shift tests which may be conducted at loads up to the rated "CLC". In addition, the two capacities provide a basis for assessing suitability of the scale. For example, a four section scale with 120,000 lb nominal and 35,000 lb concentrated load capacities would not be suitable for weighing permit loads when tandem axle groups of 40,000 lb are encountered.

The "CLC" will be marked on new scales, both on the indicator and on the weighbridge. On scales manufactured before January 1, 1989, the section capacity marking, presently required only on the indicator, will have the same meaning as "CLC" as indicated in the new S.6.7.2. However, a provision is also included to require adding to the weighbridge of an older scale at the time of modification a "CLC" marking equal to its section capacity marking. This will prevent increasing the nominal and concentrated load capacities when a beam or dial is replaced with a digital indicator.

The committee therefore recommends the following changes be made to the Scale Code:

Amend S.6.2. as follows:



## S.6.2. NOMINAL CAPACITY.

S.6.2.1. MARKING OF NOMINAL CAPACITY.- The nominal capacity shall be conspicuously marked:

- (a) on any scale equipped with unit weights or weight ranges;
- (b) on any scale with which counterpoise or equal-arm weights are intended to be used;
- (c) on any automatic-indicating or recording scale so constructed that the capacity of the indicating or recording element, or elements, is not immediately apparent;
- (d) on any scale with a nominal capacity less than the sum of the reading elements; and
- (e) on the load receiving element (weighbridge) of vehicle, axle-load and livestock scales.\*

(\*Nonretroactive as of January 1, 1989.)

The Committee recommends that a paragraph S.6.2.2. be added to the Scales Codes to read:

S.6.2.2. VEHICLE, AXLE-LOAD, AND LIVESTOCK SCALES.- For all vehicle, axle-load, and livestock scales, the marked nominal capacity shall not exceed the concentrated load capacity times the quantity of the number of sections in the scale minus 0.5. As a formula this is stated as:

Nominal Capacity  $\leq$  Concentrated Load Capacity x (N - 0.5)

where N = the number of sections in the scale.

(See N.1.3.4., T.1.3., and T.N.3.1.)

(Nonretroactive as of January 1, 1989)

Add a new heading S.6.7., renumber the current S.6.7. as S.6.7.1. with a new heading and add a subparagraph S.6.7.2. to read:

## S.6.7. VEHICLE, AXLE-LOAD, LIVESTOCK, AND RAILROAD TRACK SCALES.

S.6.7.1. RAILWAY TRACK SCALES. - A railway track scale shall be marked with the maximum capacity of each section of the load-receiving element of the scale. Such marking shall be accurately and conspicuously presented on, or adjacent to, the identification or nomenclature plate that is attached to the indicating element of the scale.

S.6.7.2. CONCENTRATED LOAD CAPACITY (CLC) - A vehicle, axle-load\*, or livestock scale shall be marked with the concentrated load capacity of the scale. Such marking shall be identified as "concentrated load capacity" or by the abbreviation "CLC" and\* shall be accurately and conspicuously shown:



- (a) on, or adjacent to, the identification or nomenclature plate that is attached to the indicating element of the scale; and
- (b) on the load-receiving element of the scale. These capacity markings shall be added to the load-receiving element of any such scale not previously marked at the time of modification.\*

On scales manufactured before January 1, 1989, the section capacity marking may be used to meet the requirements of this paragraph.

\*Nonretroactive as of January 1, 1989.

Add the following definitions:

**Concentrated Load Capacity (CLC)** - A capacity rating of a vehicle, axle-load, or livestock scale, specified by the manufacturer, defining the maximum load concentration for which the weighbridge is designed. This capacity rating is for both test and use.

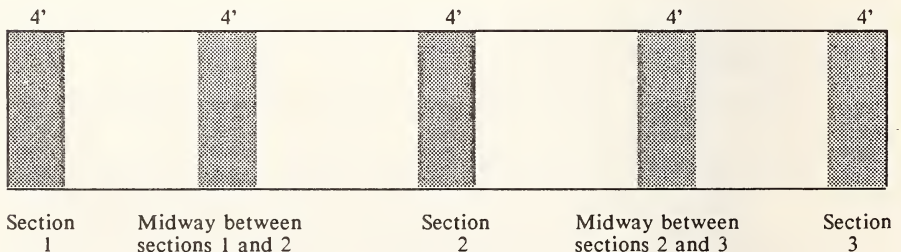
**Span (Structural)** - The distance between adjoining sections of a scale.

#### 320-5B V S.6.7. VEHICLE SCALE CAPACITY AND SECTION CAPACITY

(This item was adopted.)

In conjunction with the specifications in item 320-5A, the SMA has developed a proposal on a test pattern and prescribed test loads. These will provide definite instructions to the official testing these devices.

The test pattern is at least four feet long and a width equal to the width of the scale. This is the minimum area over which the test load may be applied. Block weights or weight carts shall be positioned within the test pattern. Each half of the pattern, that is, on either side of the center line of the scale, shall be loaded with approximately equal test loads to simulate the distribution of load on a vehicle's tire groupings.



The maximum test loads that may be applied during testing are described below:

- a) A test load equal to the CLC (or section capacity for scales manufactured before 1-1-89) may be placed in the prescribed test pattern anywhere on the scale deck.
- b) Test loads equal to the nominal capacity of the scale may be applied using

several test patterns which simulate the axle patterns of vehicles. This is to prevent overloading one portion of the weighbridge and possibly damage the scale.

When loading the test weights or weight carts in a test pattern, it is important to apply approximately equal loads to both halves of the test pattern. In no case should one side of the pattern be loaded beyond one quarter of the CLC before adding load to the other side.

The tolerance for any of these test patterns is the normal tolerance applied to the scale. These test loads and test methods may be used on any vehicle, axle-load, and livestock scales, either marked with an accuracy class or unmarked. The range of errors for all of these tests shall not exceed the limit specified in T.N.4.4.

The Committee recommends the following changes.

Amend N.1.3.4. to read:

~~N.1.3.4. LIVESTOCK SCALES WITH MORE THAN TWO SECTIONS, AND ALL VEHICLE AND AXLE LOAD SCALES. - A shift test shall be conducted with at least two different test loads successively distributed between the two load bearings (or other weighing elements) that support each section of the scale.~~  
**VEHICLE, AXLE-LOAD, AND LIVESTOCK SCALES. - A shift test shall be conducted with at least two different test loads and may be performed anywhere on the load-receiving element using the prescribed test patterns and maximum test loads specified below.**

- (a) **PRESCRIBED TEST PATTERN.** The prescribed test pattern shall be an area described by a length at least 4 feet long and a width equal to the width of the scale platform.
- (b) **MAXIMUM LOADING.** When loading the scale for testing, one side of the test pattern shall be loaded to no more than one quarter of the concentrated load capacity before loading the other side. The maximum test load applied to the prescribed test pattern shall not exceed the concentrated load capacity, or for scales installed prior to January 1, 1989, the rated section capacity.
- (c) **MULTIPLE PATTERN LOADING.** To test to the nominal capacity, multiple patterns may be simultaneously loaded in a manner consistent with the method of use.
- (d) **OTHER DESIGNS.** Special design scales and those that are wider than twelve feet shall be tested in a manner consistent with the method of use but following the principles described above.

#### 320-6 I S.6.11. REPAIR OF EQUIPMENT SUSCEPTIBLE TO INFLUENCE FACTORS

The Technical Committee on National Type Evaluation Weighing Industry Sector and the NTEP Board of Governors reviewed the issue of the repair of equipment that is susceptible to the influence factors contained in T.N.8. They concluded that equipment repaired by other than the original manufacturer or his authorized representatives is considered to be a modification of the original type, hence compliance with Handbook 44, and specifically T.N.8., must be demonstrated. This generally requires a type evaluation. In the case of load cells, the repair company requires access to test facilities in order to perform tests

to determine if the repaired equipment complies with the applicable requirements of Handbook 44.

To identify repaired equipment, the proposal would add a specification that repaired equipment that is susceptible to influence factors be marked with the name of the repair company and the date of repair. The suggested language is:

**S.6.11. REPAIRED EQUIPMENT.** - A device or component of a device which by its nature is affected by the influence factors specified in T.N.8. shall be marked upon completion of repair with the name of the repair agency and the date of repair.

The Committee agrees with the concept and that the requirement is needed. However, more time is needed to study the impact on service companies and the enforcement process. In particular, the situation of a repair made by a service company to electronics of a competitor's computing scale needs further review. Consequently, the Committee does not propose this change for adoption now, but recommends that it be discussed at the meetings of the regional weights and measures associations for possible adoption in 1989.

#### **320-7 VC N.1.2.3. ZERO-LOAD BALANCE CHANGE**

(This item was adopted.)

The requirement regarding the zero-load balance change applies to all scales. However, the numbering of this paragraph indicates that it applies only to automatic indicating scales. The Committee recommends that this section be renumbered as N.1.9. so that its application to all scales is clear.

#### **320-8 V N.3. RECOMMENDED MINIMUM TEST WEIGHTS AND TEST LOADS**

(This item was adopted.)

A proposal has been received to remove the word "recommended" from this paragraph and from Table 4. The Committee agrees that the minimum amounts of test weights and test loads specified in Table 4 should be mandatory. However, the Committee recognizes that economic and enforcement problems would occur in some states and for service companies if this change were made immediately. Consequently, the Committee recommends that the minimum test weights and test loads become mandatory as of January 1, 1994. This will give weights and measures and service companies time to plan, budget, and buy or replace equipment to meet the requirement.

The Committee recommends that a second footnote be added to N.3. below Table 4 to read:

**\*\*The word "recommended" will be deleted from this section as of January 1, 1994. This will make the amounts of test weights and test loads specified in Table 4 mandatory as of January 1, 1994.**

#### **320-9 I REPORT OF THE RAILROAD ADVISORY COMMITTEE**

The Railroad Advisory Committee has submitted a report that includes several recommended changes to the Scales Code regarding coupled-in-motion weighing. The report is based on more than two years of study and research by the Advisory Committee, with input

from various interested parties, including the American Railway Engineering Association, Association of American Railroads, Western Coal Transportation Association, National Coal Weigher's Association, and Coupled-In-Motion Scale Users. Several changes to the Scales Code regarding coupled-in-motion weighing have been recommended, having the following effects:

1. When testing existing scales used to weigh trains of **10 or more cars**, reduce the number of test runs from a minimum of 10 runs to 5 runs.
2. Add a test for scales used to weigh trains of **less than 10 cars**.
3. Recommend that the unit train (group) tolerance be stated as a percentage of the total test-train weight instead of divisions to clarify the tolerance and make it easier to apply.
4. Add a tolerance for scales used to weigh trains of **less than 10 cars**.
5. Add a User Requirement UR.5. to ensure the proper application of the tests and include a statement on the importance of considering the approach conditions before installing a coupled-in-motion scale.
6. Define "consecutive-car" and "distributive-car" test trains and permit the use of shorter consecutive-car test trains for scale testing if test data indicate that the shorter trains provide accurate results.
7. Allow for scale testing the use of distributed-car test trains and shorter consecutive-car test trains provided that test data indicate that the shorter trains result in an accurate test.

The S&T Committee requested advice regarding the uncoupled-in-motion weighing of liquids on multi-draft in-motion and manually controlled static railway track scales. The following changes were suggested to help control this practice.

The Railroad Advisory Committee recommended adding the following two user requirements:

**UR.3.8. IN-MOTION WEIGHING OF TANK CARS ON RAILWAY TRACK SCALES.**-The acceptability of weighing tank cars (liquids) on a multi-draft in-motion railway track scale when the lading is of an unstable nature is to be determined by conducting comparison tests between static and in-motion weights. The test must employ the same types of loaded tank cars and commodities that are intended to be weighed in the normal operation.

**UR.3.9. MANUALLY CONTROLLED STATIC WEIGHING DEVICES ON RAILWAY TRACK SCALES.**- The indication of a manually controlled static weighing device must be stable within plus or minus three graduations before the weight is recorded.

The S&T Committee is aware that individual car weights obtained from in-motion weighing are used for custody transfer (sale of commodities). The Committee has serious reservations about this practice since it can result in relatively large errors in the weights for individual cars. In some cases the stencilled tare weight for the car is used to determine the net weight of the commodity, which has the potential for introducing another relatively large error into the net weight determination. The Committee has similar reservations regarding the in-motion weighing of tank cars. This issue should be carefully studied over the next year and comments submitted to the S&T Committee for consideration before a final recommendation is made.

No changes regarding railway weighing are recommended this year. The Committee recommends that the regional weights and measures associations request presentations on these proposals to study and understand the issues. The Committee recommends that the Railroad Advisory Committee work through the Association of American Railroads and the American Railway Engineering Association to develop a detailed examination procedure outline that



can be used to evaluate the performance of in-motion weighing for solid- and liquid-laden cars.

The Committee thanks the Railroad Advisory Committee for its work and diligent efforts to develop and analyze test data to provide a basis for Conference action. The Committee appreciates the development of recommendations for change to Handbook 44. Continued assistance is needed for the Committee and weights and measures officials to understand the impact of the proposals before the Conference takes action. The S&T Committee anticipates that changes to the Handbook will be recommended in 1989.

The S&T Committee has revised and reorganized the changes proposed by the Advisory Committee. The revised proposals are reported below.

#### **PROPOSED TEST PROCEDURES & TOLERANCES FOR COUPLED-IN-MOTION RAILWAY TRACK SCALES**

Add the following definitions:

**Test train.** A train consisting of cars weighed on a reference scale and used to test coupled-in-motion railway track scales. The test cars may be placed consecutively or distributed in different places within a train.

**Consecutive-car test train.** A train consisting of cars weighed on a reference scale, then coupled consecutively and run over the coupled-in-motion railway track scale under test.

**Distributed-car test train.** A train consisting of cars weighed first on a reference scale, cars coupled consecutively in groups at different locations within the train, then run over the coupled-in-motion railway track scale under test. The groups are typically placed at the front, middle, and rear of the train.

Add the following paragraphs:

#### **N.5. COUPLED-IN-MOTION RAILWAY TRACK SCALES**

##### **N.5.1. SCALES USED TO WEIGH TRAINS OF LESS THAN 10 CARS.-**

- (a) These scales shall be tested using a consecutive-car test train consisting of the number of cars weighed in the normal operation.
- (b) The test train shall be run over the scale a minimum of five times in each mode of operation following the final calibration.

##### **N.5.2. SCALES USED TO WEIGH TRAINS OF 10 OR MORE CARS.-**

###### **N.5.2.1. SCALES PLACED IN SERVICE PRIOR TO JANUARY 1, 1989.-**

Scales placed in service prior to January 1, 1989, shall be tested for initial verification using a consecutive-car test train of no less than 10 cars run over the scale a minimum of five times.



N.5.2.2. SCALES PLACED IN SERVICE ON OR AFTER JANUARY 1, 1989.- These scales shall be tested in a manner that represents the normal method of operation and length(s) of trains normally weighed. The scales may be tested using either:

- (a) a consecutive-car test train of a length typical of train(s) normally weighed; or
- (b) a distributed-car test train of a length typical of train(s) normally weighed.
- (c) However, a consecutive-car test train of a shorter length may be used provided that initial verification test results for the shorter consecutive-car test train agree with the test results for the distributed-car or full-length consecutive-car test train as specified in N.3.1.2.1.

The testing authority shall be responsible for determining the minimum test train length to be used on subsequent tests.

N.5.2.2.1. INITIAL VERIFICATION.- Initial verification tests shall be performed on any new scale and whenever either the track structure or the operating procedure changes. If a consecutive-car test train of length shorter than trains normally weighed is to be used for subsequent verification, the shorter consecutive-car test train results shall be compared to either a distributed-car or consecutive-car test train of length(s) typical of train(s) normally weighed.

The difference between the total train weight of the train(s) representing the normal method of operation and the shorter consecutive-car test train shall not exceed 0.15 percent. If the difference in test results exceeds 0.15 percent, the length of the shorter consecutive-car test train shall be increased until agreement within 0.15 percent is achieved.

N.5.2.2.2 SUBSEQUENT VERIFICATION.- The test train may consist of either a consecutive-car test train with a length not less than that used in initial verification, or a distributed-car test train representing the number of cars used in the normal operation.

N.5.2.2.3. DISTRIBUTED CAR TEST TRAINS.-

- (a) The length of the train shall be typical of trains that are normally weighed.
- (b) The test cars shall be split into three groups, each of which shall consist of 10 cars or 10 percent of the train length, whichever is less.
- (c) The test groups shall be placed near the front, around the middle, and near the end of the train.
- (d) Following the final adjustment, the distributed-car test train shall be run over the scale at least 3 times or shall

produce 50 weight values, whichever is greater.

- (e) The scale shall be tested in each mode of operation.

N.5.2.2.4. CONSECUTIVE-CAR TEST TRAINS.-

- (a) A consecutive-car test train shall consist of at least 10 cars.
- (b) If the consecutive-car test train consists of more than 20 cars, it shall be run over the scale a minimum of 3 times in each mode of operation.
- (c) If the consecutive-car test train consists of between 10 and 20 cars, inclusive, it shall be run over the scale a minimum of 5 times in each mode of operation following the final adjustment of the scale.

T.N.3.6. - COUPLED-IN-MOTION WEIGHING, OTHER THAN MONORAIL-  
SCALES. - Tolerances for the group of weight values appropriate to the  
application must satisfy the following conditions:

T.N.3.6.1.- For any group of weight values, the variation in the sum of the individual in-motion car weights of the group as compared to the sum of the individual static weights shall not exceed two tenths of one percent (0.2%).

T.N.3.6.2.- If a scale is used to weigh trains of five or more cars, and if the individual car weights are used, any single weight value within the group must meet the following criteria:

- (a) no single error may exceed three times the static maintenance tolerance;
- (b) not more than 5 percent of the errors may exceed two times the static maintenance tolerance; and
- (c) not more than 35 percent of the errors may exceed the static maintenance tolerance.

T.N.3.6.3.- For a scale used to weigh trains of less than five cars, no single car weight within the group may exceed the static maintenance tolerance.

Current T.N.3.6.3. and T.N.3.6.4. become T.N.3.6.4. and T.N.3.6.5.

UR.5. - RAILWAY TRACK SCALES WEIGHING COUPLED-IN-MOTION.-

A coupled-in-motion scale placed in service on or after January 1, 1989 shall be tested in the manner in which it is operated, with the locomotive either pushing or pulling the cars at the designed speed and in the proper direction. The cars used in the test train should represent the range of gross weights that will be used during the normal operation of the scale. Normal operating procedures should be simulated as nearly as practical. Approach conditions for a train length in each direction of the scale site are more critical for a scale used for individual car weights than for a unit-train-weights-only facility, and should be considered prior to the installation of the coupled-in-motion weighing system.

**320-10 W T.1.2. TOLERANCE VALUES - SCALES WITH LESS THAN 2000 SCALE DIVISIONS OR MORE THAN 5000 SCALE DIVISIONS**

The Committee received a proposal to delete T.1.2. and Table 5 from the Scales Code in an effort to simplify the tolerance application to marked and unmarked scales. The Committee believes this is not realistic. Deletion of T.1.2. and Table 5 would depart from conditions agreed in the development of the new Scales Code. The Committee believes that the new code would not have been accepted without this paragraph. Consequently, the Committee withdraws this item.

**320-11 W T.1.6. JEWELERS' SCALES**

The Committee received a proposal to limit T.1.6. to nonautomatic indicating jewelers' scales and equal-arm jewelers' scales. It was suggested that the tolerances for class II and III scales are applied to all digital indicating jewelers' scales based upon whether the scales have more than 10,000 or less than 10,000 scale divisions, respectively. The Committee concluded that this would result in the rejection for inaccuracy of many scales because many of these same types of scales now carry an accuracy class marking and have a verification scale division greater than the displayed scale division. Consequently, the Committee withdraws this item.

**320-12 W T.N. SECTION**

It was proposed that a tolerance be added for the decreasing load test for mechanical automatic indicating scales, particularly mechanical spring dial scales. Reportedly, a significant number of these scales do not comply with the existing tolerances for class III scales. The Committee is unwilling to recommend a change that would depart from the principles for establishing the tolerance structure for marked devices and the basis for accepting the new Scales Code. Consequently, the Committee withdraws this item.

**320-13 W T.N.3.3. TOLERANCES FOR WHEEL-LOAD WEIGHERS AND PORTABLE AXLE-LOAD SCALES OF CLASS IIII**

A proposal was received to change the tolerances for wheel-load weighers and portable axle-load scales of class IIII to essentially two percent and delete the present T.N.3.3. to provide a more reasonable and realistic tolerance structure for these scales. The Committee is unwilling to recommend a change that would depart from the principles for establishing the tolerance structure for marked devices and the basis for accepting the new Scales Code. Moreover, the impact of this change would be too great on all class IIII scales. Consequently, the Committee withdraws this item.

**320-14 I UR.3.1. RECOMMENDED MINIMUM LOAD**

A proposal was received to remove the word "recommended" from UR.3.1. and Table 8 in order to strengthen the minimum load statement for enforcement purposes. The Committee agrees with the intent of the proposal and believes that the requirement should be used in the process of determining the suitability of equipment. However, the Committee does not believe that the proposed change would improve enforceability.

The Committee is considering adding a paragraph to S.6. MARKING REQUIREMENTS to require the marking of the minimum load on scales consistent with the international requirement. Although no action is recommended for 1988, the Committee suggests the following language for consideration for possible adoption in 1989.

S.6.X. MINIMUM LOAD.- The value of the minimum load to be weighed on the scale shall be conspicuously marked adjacent to the weight display. The marking shall be expressed as "min" and may be stated in either scale divisions or as a weight value. (Nonretroactive as of January 1, 1990)

The Committee strongly urges that the recommended minimum load consideration be applied to all scales because large relative errors occur when small loads are weighed. Since weight values are normally rounded to the nearest scale division, potential error is one-half scale division for each weight determination. The maximum potential error resulting from this round-off error is shown below as a percentage of the load. The Committee recommends that this information be brought to the attention of field enforcement officials to help promote the proper use of scales with respect to the minimum load.

<u>Applied Load</u>	<u>Potential Round-off Error</u>	<u>Potential Error as a Percentage of Load</u>
2 000 d	0.5 d	0.025%
1 000 d	0.5 d	0.05%
500 d	0.5 d	0.01%
100 d	0.5 d	0.5%
50 d	0.5 d	1.0%
20 d	0.5 d	2.5%
15 d	0.5 d	3.3%
10 d	0.5 d	5.0%
5 d	0.5 d	10.0%
1 d	0.5 d	50.0%

### 320-15 W UR.3.3. SINGLE-DRAFT WEIGHING

A proposal was made to require that railroad cars be weighed as a single draft. Coupled- and uncoupled-in-motion weighing, and multi-draft weighing is a common practice in the industry. The single-draft weighing of railroad cars was specifically omitted from UR.3.3. when single-draft weighing was required for vehicle weighing. Coupled- and uncoupled-in-motion weighing, and multi-draft weighing has proven itself to be sufficiently accurate and practical. Prohibiting this type of weighing of railroad cars cannot be justified because of the economic consequences. The Committee withdraws this item.

### 320-16 VC UR.3.6. WET COMMODITIES

(This item was adopted.)

In response to health and sanitation concerns, some stores and fish markets place fresh fish or other wet commodities in plastic bags before weighing. In these cases the scales are not required to have a pan or platform that will drain properly. To clarify when a pan that drains excess water is required, the Committee recommends that UR.3.6. be amended to read:

**UR.3.6. Wet Commodities. - ~~Wet fish and other wet commodities~~ not in watertight containers shall be weighed only on a scale having a pan or platform that will drain properly.**



320-17 V UR.3.7. MINIMUM LOAD ON A VEHICLE SCALE

(This item was adopted.)

Proposals have been received from all four regional weights and measures associations to amend UR.3.7. so that the minimum load requirement applies to the net load. The justification for change cites as the reason for change the relatively large errors present in small loads due to rounding to the nearest scale division and the inappropriateness of weighing small loads on a vehicle scale. When weighing both the gross and tare weight to the nearest scale division, the potential round-off error is doubled. The proposals suggested that the minimum load be expressed as either 50 d or 1,000 lb. Expressing the minimum load as 50 d is consistent with Table 8. Consequently, the Committee recommends that UR.3.7. be amended to read:

**UR.3.7. Minimum Load on a Vehicle Scale - A vehicle scale shall not be used for weighing a-load net loads smaller than-1,000-lb 50 d.**

320-18A V UR.1.1. SELECTION REQUIREMENTS - GENERAL; TABLE 7a

(This item was adopted.)

The S&T Committee met jointly with the Liaison Committee to discuss the types of scales that are appropriate for use to determine service charges, such as shipping and laundry scales, and, in particular, the scales used in businesses that serve as pick-up points for private shipping companies. This issue has reached a critical level because of the large number of stores and businesses that now serve as pick-up points.

Such businesses provide a useful service to the public and the scales they use to determine the charges for packages are commercial devices. It is important that class III (III L for large capacity scales) or higher accuracy class scales be used in commercial applications. Supporting comments were received from weights and measures officials during this joint meeting. The Committees urge enforcement agencies to require that class III scales be used to determine ship-ping and laundry charges.

To clearly indicate that scales used for shipping and laundry charges are to be class III scales, the Committee recommends that the listing in Table 7a for class III scales be amended to read:

**III All commercial weighing not otherwise specified, grain test scales, retail precious metals and semi-precious gem weighing, animal scales, postal scales, and scales used to determine laundry charges.**

320-18B V UR.1.1. SELECTION REQUIREMENTS - GENERAL; TABLE 7a

(This item failed.)

In conjunction with the above issue, the S&T Committee considered a proposal to amend Table 7a to show that the list of weighing applications and scale types in the table is not all-inclusive. It was also requested that the table be modified to show that some class III scales may be appropriate for use in some commercial applications, in particular, for use as laundry and shipping scales used to determine shipping charges.

It is important that class III (III L for large capacity scales) or higher accuracy class scales be used in commercial applications. The Committee agreed that the list of scale



types and typical applications in Table 7a is not all-inclusive. Specifically, the Committee concluded that the category of class III scales allows noncommercial scales to be marked class III. The Committee believes that the class III marking is equivalent to marking a scale as "Not Legal For Trade." Handbook 44 cannot be used to require that all noncommercial scales be marked with class III; however, the Committee believes that a marking of class III would help to achieve the objective that only scales of class III or higher accuracy classes be used commercially.

To facilitate this understanding and aid the enforcement official in applying the suitability requirement of UR.1., the Committee recommends that the listing for class III scales be amended to read:

**III Highway weight enforcement, wheel-load weighers, ~~and~~ portable axle-load weighers, and other noncommercial scales.**

### **320-19 VC DEFINITION OF WEIGHING ELEMENT**

(This item was adopted.)

The Committee was requested to establish a definition for weighing element. With the assistance of industry, the Committee reviewed the use of the terms weighing element, load-receiving element, and indicating element. Based upon usage, the Committee concluded that the definition stated below most accurately reflects its use in the Handbook and recommends that the definition be adopted.

Add the following definition:

**Weighing element.** That portion of a scale that supports the load-receiving element and transmits to the indicating element a signal or force resulting from the load applied to the load-receiving element.

### **320-20 I COUNTING SCALES**

The Committee is considering developing specifications for counting scales and tolerances for the counting process. A comment was received that counting scales are not considered to be legal devices in the international arena because the accuracy of count as determined by weighing depends upon the variation in weights of the commodity. The Committee requests the assistance of the Scale Manufacturers Association, the manufacturers of counting scales, weights and measures officials, and other interested parties to develop appropriate requirements for counting scales.

### **320-21 VC THE POSITION TEST ON VEHICLE SCALES**

(This item was adopted.)

NTEP has a position test and a tolerance for the position test described in the type evaluation procedure for vehicle scales; however, Handbook 44 does not have the tolerance nor does Handbook 44 reference the position test. The Committee was requested to review the test to determine if it is appropriate and, if so, to determine the appropriate tolerance for the test for incorporation into Handbook 44.

Although the test is useful in the evaluation of the design and performance of a vehicle scale, the Committee does not consider this type of test to be appropriate as a field test.

Since the proposal from the SMA regarding the test patterns and test loads provides for testing a scale by applying one-quarter of the permitted test load over one-half of a pair of test areas, this type of test should be sufficient for use in type evaluation. **Consequently, the Committee recommends that the conduct of the position test and the use of its associated tolerance be discontinued in the type evaluation process.**

### **320-22 I REPORT OF THE TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION-WEIGHING INDUSTRY SECTOR**

The Technical Committee met in October, 1987 and is scheduled to meet again in June, 1988. Its recommendations for changes to Handbook 44 are separate items on the agenda. Its recommendations regarding NTEP administrative policy have been addressed by the NTEP Board of Governors and its recommendations regarding technical policy, criteria and test procedures have been incorporated in the draft type evaluation handbook, to be presented to the Conference for adoption. (See Executive Committee report.)

The Report of the Technical Committee is contained in the Report of the Executive Committee. Several important issues affect the enforcement responsibilities and activities of the field official. The Committee recommends that enforcement officials study and apply to their enforcement activities the information and guidelines contained in items I, V, VI, XII, XIII, and XIV.

### **SECTION 3.30 LIQUID-MEASURING DEVICES CODE**

#### **330-1A V REVISED LIQUID-MEASURING DEVICES CODE**

(This item was adopted.)

The Liquid-Measuring Devices (LMD) Code has been revised with the objectives of simplifying the language and improving the format of the code, emphasizing clarification without changing or adding requirements. Several recommendations for change have been received and made as appropriate. The revised code is contained in Appendix A to this report. The response to the revised code has been favorable. If this item is adopted, the revised code will replace the current LMD Code in the 1989 Edition of Handbook 44. **The Committee recommends adoption of the revised Liquid-Measuring Devices Code.**

#### **330-1B VC S.1.4.5. AGREEMENT BETWEEN INDICATIONS**

(This item was adopted.)

Paragraph S.1.4.5. was originally added as a retroactive requirement in 1985. Its original intent was to require mathematical agreement of quantity, unit price, and total price indications on the service station console, recognizing that the quantity value displayed at the console may differ slightly from the quantity displayed on the retail fuel dispenser. This difference could occur because the console may compute the quantity from the total price value transmitted from the dispenser and the unit price information stored in the console. The objectives of the change were to consider the indications on service station consoles as the primary indications and to require the mathematical agreement of displayed values. Many service station consoles did not comply with the mathematical agreement requirement of G-S.5.5. because they were considered auxiliary indications, which are exempt from the mathematical agreement requirement of G-S.5.5.

The retroactive status of S.1.4.5. in 1985 caused all service station consoles that did not

have mathematical agreement of indications to be incorrect devices. It was not the intent of the Committee or the Conference to designate existing consoles incorrect devices on this basis, so in 1986 the entire paragraph was made nonretroactive; however, only part (b) should have been made nonretroactive. If all consoles are considered primary indicating elements, then when S.1.4.5. was made nonretroactive in 1987, all consoles placed in service before 1988 had to comply with the mathematical agreement requirement of G-S.5.5. This created the same situation as when S.1.4.5. was retroactive. **Consequently, the Committee recommends that S.1.4.5. be amended such that only part (b) is nonretroactive as of January 1, 1988.**

- 330-2 I S.1.4.3. DISPLAY OF UNIT PRICE AND PRODUCT IDENTITY  
UR.3.2. UNIT PRICE AND PRODUCT IDENTITY
- 330-3 W S.1.4.4. MONEY-VALUE COMPUTATIONS
- 330-4 W S.1.4.8. CUSTOMER'S INDICATIONS, REMOTE CONSOLES

Problems and confusion reportedly stem from marketing practices with multi-tier pricing at service stations including:

1. product sold at more than one unit price from dispensers able to compute at only one unit price;
2. consumers not receiving advertised discounts to which they are entitled based on the method of payment;
3. console operators not setting the dispenser to compute at the correct unit price;
4. failure to post all unit prices at which the product may be sold; and
5. customer confusion based on the differing merchandising methods and operating systems.

Three proposals were received to solve these problems; they are discussed as 330-2, 330-3, and 330-4.

- 330-2 Amend S.1.4.3. and UR.3.2. to require that all unit prices at which fuels can be dispensed be (1) simultaneously displayed on the dispenser or (2) posted on the dispenser if the unit price is not automatically displayed.

This proposal is withdrawn in favor of the position expressed in the summary below.

- 330-3 Permit selection of the unit price only at the dispenser in order to eliminate the potential for fraud resulting from the console operator changing the customer-selected unit price. Restrict the price change (not selection) operation from the console to a time when all dispensers are in the shut-off condition.

This proposal is withdrawn in favor of the position expressed in the summary below.

- 330-4 Add a nonretroactive paragraph that requires a display visible to customers on those consoles at which operators have the ability to recompute prices.

Many consoles provide the capability to recompute total sales prices for different unit prices without the customer knowing if the new amount stated by the console operator is correct because the display is not visible to the customer.

This proposal is withdrawn in favor of the position expressed in the Summary below.

#### Summary

Based upon information received and discussed by the Committee, it is clear that there is a nation-wide problem. The Office of Weights and Measures is requested to consult with the American Petroleum Institute, the oil companies, equipment manufacturers, and the Service Station Dealers of America, Inc. to seek mutually acceptable solutions. In the absence of other solutions, the Committee plans to offer the following amendments to the LMD Code in July 1989.

1. Limit the use of dispensers to sales only at the price or prices for which they can compute; if a dispenser can compute at only one price, it may be used only for sales at that price.
2. Permit selection of the unit price only by the customer at the dispenser; the console operator will be required to select the same unit price at the console before the dispenser becomes authorized.

Under G-UR.1.1. Suitability of Equipment, commercial equipment must be suitable for its use with respect to its design, including its computing capability if it is a computing device. In the case of retail motor fuel dispensers used for multi-tier pricing, this means that the dispenser must be able to compute at all of the prices at which the product is offered for sale to the public. Although weights and measures jurisdictions have often permitted dispensers to compute at one price and obtain the total price for other unit prices by recomputing or discounts, the S&T Committee encourages enforcement officials to require suitable equipment for multi-tier pricing applications. The S&T Committee plans to proceed with the amendments identified above for adoption in 1989.

#### 330-5 I DEFINITIONS OF RETAIL AND WHOLESALE DEVICES

The Committee was asked to review the definitions for retail and wholesale devices. Apparently, the main problem concerns the appropriate value of the graduations in the application of vehicle tank meters since the same meter may be used both as a retail and a wholesale device. This results in ambiguity as to which specifications and tolerances apply.

The Committee considered the definition for a retail device from the LPG and Anhydrous Ammonia Liquid-Measuring Devices Code as a starting point. Another possibility is a definition based upon the rated flow of the meter. The Committee did not develop a satisfactory definition; consequently, it does not make any recommendation for action this year. The Committee requests information from weights and measures officials on specific problems encountered and the extent of the problem. The Committee may then be in a better position to recommend action next year.

#### 330-6 I TEST PROCEDURE FOR WHOLESALE (LOADING-RACK) METERS

A task force of the American Petroleum Institute (API) developed an expanded test procedure for loading-rack meters for consideration by the NCWM. Some procedures used by industry and enforcement officials differ greatly. The Office of Weights and Measures drafted a new examination procedure outline converting the API procedure into an Examina-



tion Procedure Outline format. Comments on this conversion are requested from members of the petroleum industry and weights and measures officials. If the response is favorable, the Office of Weights and Measures will issue the draft procedure as a recommended examination procedure outline. Copies are available from the Office of Weights and Measures.

### **330-7 I REPEATABILITY TOLERANCES**

The repeatability of a meter is an important issue that is not addressed in the LMD Code. A limit on the difference between test results for the normal and special tests should be considered. The Northeastern Weights and Measures Association will explore the issue to determine how many tests should be run to quantify repeatability during enforcement tests and to recommend the appropriate tolerance.

The American Petroleum Institute, the Gas Pump Manufacturers' Association, and the Meter Manufacturers' Association are encouraged to submit comments and advice regarding the best way to approach this issue.

### **330-8 I OCTANE RATINGS FOR BLEND DISPENSERS**

The S&T Committee met jointly with the Laws and Regulations (L&R) Committee to explore the effect on the octane level of products that are blended in a blend dispenser. Several states described their methods for sampling the product from blend dispensers. Representatives of equipment manufacturers and the oil industry explained their positions on the issue.

The Committee concluded that the issue is an L&R Committee matter. The S&T Committee is not proposing any action as a result of this meeting. If the L&R Committee decides that changes are needed in Handbook 44, the changes will be proposed in the future.

### **330-9 VC REPORT OF THE TECHNICAL COMMITTEE ON NATIONAL TYPE EVALUATION - MEASURING INDUSTRY SECTOR**

(This item was adopted.)

The Measuring Industry Sector of the Technical Committee on National Type Evaluation discussed the permanence test procedures and type evaluation criteria for card-activated systems, the comments from the Gas Pump Manufacturers' Association on the type evaluation checklist, and other concepts that may be considered in the future for the permanence test.

The Committee's conclusions are provided in Appendix B. **It is recommended that the Conference adopt the proposed changes and that they be incorporated in the type evaluation handbook (NCWM Publication 14).**

## **Section 3.31 VEHICLE TANK METERS CODE**

### **331 I T.2. TOLERANCE VALUES, SPLIT-COMPARTMENT TESTS**

Over the past several years, the Northeastern Weights and Measures Association conducted a series of tests to collect information on meter performance for the split-compartment test. It plans to conduct another survey of meter performance in the coming year. Based on the results, it may propose a different method of applying the tolerance to the split-compartment test. No Conference action is proposed for this year.



### SECTION 3.32 LIQUIFIED PETROLEUM GAS AND ANHYDROUS AMMONIA LIQUID-MEASURING DEVICES CODE

#### 332-1 VC S.1.1.5. MONEY VALUES

(This item was adopted.)

A proposal was made to replace the words "motor fuel" with "stationary retail" to clarify the application of this paragraph and broaden its application to include stationary devices that are used for retail deliveries of other than motor fuel. The Committee recommends that S.1.1.5. be amended to read:

**S.1.1.5. MONEY VALUES - MATHEMATICAL AGREEMENT.** - Any digital money-value indication and any recorded money value on a computing-type device shall be in mathematical agreement with its associated quantity indication or representation to within one cent of money value; ~~a-motor-fuel~~ except that a stationary retail computing-type device must compute and indicate to the nearest one cent of money value (see Section 1.10., G-S.5.5.) (Amended 1984 and 1988).

#### 332-2 VC T.2. TOLERANCE VALUES FOR NORMAL AND SPECIAL TESTS

(This item was adopted.)

In 1987, the tolerances were changed from a specified number of cubic inches per indicated gallon to a percentage of the indicated quantity. In 1987, the Committee stated that it would consider changes to these tolerances to make them "rounded" values. A supporting proposal has been received. The State of New York submitted test data demonstrating that the distribution of meter errors for devices tested were consistent with the tolerances under consideration.

The Committee recommends that paragraphs T.2.1. and T.2.2. in Section T.2. be deleted and replaced with the following:

**T.2. TOLERANCE VALUES.**- The maintenance and acceptance tolerances for normal and special tests shall be:

	Underregistration	Overregistration
(a) On normal tests		
Acceptance tolerance	0.75%	0.5%
Maintenance tolerance	1.5%	1.0%
(b) On special tests		
Acceptance and maintenance tolerance	1.5%	1.0%

SECTION 3.33 HYDROCARBON GAS VAPOR-MEASURING  
DEVICES CODE

333 VC PROPOSED CHANGES

(This item was adopted.)

Recommendations have been made to change several paragraphs in this code for the following reasons.

1. The requirements of this code apply to meter types other than positive displacement meters, for example, turbine and orifice meters.
2. Meters with rated capacities in excess of 10,000 cubic feet per hour need larger minimum units and larger increments for their proving indicators.
3. It is not always possible or practical to test at the rated capacity of a device or at exactly 20 percent of the capacity rate or the minimum flow rate marked on the device.
4. Several additional items of information should be required on billing statements.
5. A table is needed to specify the altitude correction factor to be used.

The most significant proposed changes are to paragraphs UR.2.2. and UR.2.3. The changes to UR.2.2. require more information on the invoice than required in the past. The proposed change to UR.2.3. is the addition of a table of correction factors for atmospheric pressure with respect to altitude. The other proposed changes broaden the code to include other meters that may be used in commercial transactions.

The Committee recommends adoption of the following changes.

A.1. - This code applies to ~~positive displacement~~ devices used for the measurement of hydrocarbon gas in the vapor state such as propane, propylene, butanes, butylenes, ethane, methane, and any other hydrocarbon gas/air mix.

S.1.1.3. VALUE OF SMALLEST UNIT. - The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed:

- (a) 100 cubic feet or 1 cubic meter (1,000 cubic decimeters) when the maximum rated gas capacity is less than 10,000 cubic feet per hour
- (b) 1,000 cubic feet or 10 cubic meters when the maximum rated gas capacity is 10,000 cubic feet per hour up to but not including 60,000 cubic feet per hour.
- (c) 10,000 cubic feet or 100 cubic meters when the maximum rated gas capacity is 60,000 cubic feet per hour or more.

S.1.1.5. PROVING INDICATOR. - ~~A device~~ Devices rated less than 10,000 cubic feet per hour gas capacity shall be equipped with a proving indicator measuring 1, 2, 5, or 10 cubic feet per revolution, or 0.025, 0.05, 0.1, 0.2, or 0.25 cubic meter per revolution, for testing the meter. Devices with larger capacities shall be equipped as follows:

- (a) Devices rated 10,000 up to but not including 60,000 cubic feet per hour gas capacity shall be equipped with a proving indicator measuring not greater than 100 cubic feet or 1 cubic meter per revolution.
- (b) Devices rated 60,000 cubic feet per hour gas capacity or more shall be equipped with a proving indicator measuring not more than 1000 cubic feet or 10 cubic meters per revolution.

The test circle of the proving indicator shall be divided into 10 equal parts. Additional subdivisions of one or more of such equal parts may be made.

N.4.1. NORMAL TESTS. - The normal test of a device shall be made at a rate not to exceed the capacity rate given on the badge of the meter.

N.4.2.1. SLOW TEST. - The device shall be tested at a rate not less than 20 percent of the marked capacity rate, or (at the check rate) not less than the minimum flow rate if marked on the device, whichever is less.

UR.2.2. INVOICES. - A customer purchasing liquefied-petroleum hydrocarbon gas measured by a vapor meter shall receive from the seller an invoice for each billing period. ~~The invoice shall have shown clearly thereon the total charge for the billing period, the total quantity being billed, the altitude correction factor, the last meter reading and the date of that reading, and the rate schedule number at which the product is being billed. - If the vapor meter is equipped with an automatic temperature compensator, or any other means are used to compensate for temperature, the invoice shall show thereon that the volume has been adjusted to the volume at 60 degrees F. - Any invoice on which the charge is based on units other than cubic feet or cubic meters shall have shown thereon the cubic foot or cubic meter equivalent of the unit on which the charge is based~~ clearly and separately show the following.

- (a) The opening and closing meter readings and the dates of those readings.
- (b) The altitude correction factor.
- (c) The total cubic feet billed, corrected for altitude.
- (d) The charge per cubic foot after correction for altitude.
- (e) All periodic charges independent of the measured gas, such as meter charges, meter readings fees, service charges or a minimum charge for a minimum number of cubic feet.
- (f) The total charge for the billing period.

If the vapor meter is equipped with an automatic temperature compensator, or any other means are used to compensate for temperature, the invoice shall show that the volume has been adjusted to the volume at 60 °F.

UR.2.3. CORRECTION FOR ALTITUDE. - ~~An approved multiplier table of corrections shall be used to correct for changes in the atmospheric pressure with respect to altitude. - The multiplier for a particular installation shall be affixed on the front of the device near the base. The metered volume of gas shall be corrected for changes in the atmospheric pressure with respect to altitude to the standard pressure of 14.73 pounds per square inch. The appropriate altitude correction factor from Table 2 shall be used. The barometric pressure assumed~~

to exist at the meter for various elevation zones shall be taken from Table 2.  
(The table is modified from NBS Handbook 117.)

Add Table 2:

TABLE 2 - CORRECTIONS FOR ALTITUDE

Elevation	Altitude Correction Factor		Assumed Barometric Pressure	Gauge Pressure	
	11 in WC	7 in WC		(11 in WC)	(7 in WC)
feet			psi	psi	psi
-150 to 400	1.02	1.01	14.64	15.04	14.89
above 400 to 950	1.00	0.99	14.35	14.74	14.60
above 950 to 1550	0.98	.97	14.05	14.45	14.30
above 1550 to 2100	.96	.95	13.76	14.15	14.01
above 2100 to 2700	.94	.93	13.46	13.86	13.71
above 2700 to 3300	.92	.91	13.17	13.56	13.42
above 3300 to 3950	.90	.89	12.87	13.27	13.12
above 3950 to 4550	.88	.87	12.58	12.97	12.83
above 4550 to 5200	.86	.85	12.28	12.68	12.53
above 5200 to 5850	.84	.83	11.99	12.38	12.24
above 5850 to 6500	.82	.81	11.69	12.09	11.94
above 6500 to 7200	.80	.79	11.40	11.79	11.65
above 7200 to 7900	.78	.77	11.10	11.50	11.35
above 7900 to 8600	.76	.75	10.81	11.20	11.06
above 8600 to 9350	.74	.73	10.51	10.91	10.76
above 9350 to 10100	.72	.71	10.22	10.61	10.47
above 10100 to 10850	.70	.69	9.92	10.32	10.17
above 10850 to 11650	.68	.67	9.63	10.03	9.88
above 11650 to 12450	.66	.65	9.33	9.73	9.58
above 12450 to 13250	.64	.63	9.04	9.44	9.29
above 13250 to 14100	.62	.61	8.75	9.14	9.00
above 14100 to 14950	.60	.59	8.45	8.85	8.70

Altitude Correction factors were obtained by using the following equation:

$$\text{Altitude Correction Factor} = \frac{\text{gauge pressure of gas plus assumed barometric pressure}}{\text{base pressure of 14.73 psi absolute}}$$

11 inches of water column = 0.397 lb per square inch

7 inches of water column = 0.253 lb per square inch

## Section 4.44 MILK BOTTLES CODE

## 344 V MILK BOTTLES CODE

(This item was adopted)

A proposal was received to increase the tolerances for milk bottles to reflect current manufacturing techniques. An investigation into the issue revealed that there is only one manufacturer of glass milk bottles in North America and that production is limited. The Committee received the comment that the amount of milk sold in glass bottles has dropped from approximately 20 percent of all milk sold in 1965 to less than 0.5 percent for the last five years.

The manufacturer's specifications for the variation in capacity for the glass milk bottles are much smaller than the maximum allowable variations for packaged liquids specified in NBS Handbook 133 for packages of the same capacity. The manufacturer has offered to increase the capacity of new milk bottles such that their minimum capacity specification is equal to the nominal capacity of the bottle if the Milk Bottle Code is eliminated and bottled milk is treated as packages. The procedures given in NBS Handbook 133 would then be used to determine the accuracy of the quantity statement on milk sold in glass bottles. The distributor of the milk bottles contacted the dairies using the bottles and the dairies support this proposal.

The Committee recommends that the Milk Bottle Code be deleted from Handbook 44 and that milk sold in glass bottles be treated as packages.

## SECTION 4.47 DRY MEASURES CODE

## 347-1 W S.1. UNITS

(This item was withdrawn by the Committee before a vote.)

Uncalibrated and nonstandard dry measures with capacities less than 1/32 bushel are used to sell seeds, paint glitter, potpourri, and other products. Dry measures with capacities of 1/32, 1/100, 1/200, and 1/400 dry pint are roughly equivalent to the scoop sizes used in some seed shops. These applications do not justify the use of class II scales, which are needed to weigh small quantities. The Committee was requested to amend S.1. to allow the use of 1/100, 1/200, and 1/400 dry pint measures in these applications.

The Committee agreed that this is a reasonable approach to the problem and recommends that S.1. be amended to read:

**S.1. UNITS - Except for dry measures having a capacity of 1/32 dry pint or less,**

- (a) the capacity of a measure shall be 1 bushel, a multiple of a bushel, or a binary submultiple of the bushel; and
- (b) the measure shall not be subdivided or double-ended.

Amend the existing T.1. by adding the heading

**T.1. TOLERANCES FOR MEASURES WITH CAPACITIES OF 1/32 PINT OR MORE.**

Delete the words "or less" from Table 2.



Add a new paragraph T.2. to read:

**TOLERANCES FOR MEASURES WITH CAPACITIES LESS THAN 1/32 PINT.-**  
Measures with a capacity of less than 1/32 pint shall have a tolerance of  $\pm 10$  percent of capacity or 0.05 mL, whichever is less.

**347-2 VC N.1.2. NONWATERTIGHT DRY MEASURES**

(This item was adopted.)

A proposal was made to allow the capacity of dry measures to be determined by measuring the inside dimensions of a measure and calculating the capacity. The Committee agrees with the concept, but is concerned that the accuracy of the measurement method may not be sufficient because the dry measure may not be uniformly shaped as a regular geometric figure. However, the Committee is willing to allow this method of determining the capacity of dry measures provided the user can assure that the uncertainty in the test method is less than one-third of the tolerance applied to the test measure. If there is any question regarding the accuracy of the method, the capacity of the dry measure should be determined by using rape seed.

The Committee recommends that N.1.2. be amended to read:

**N.1.2. NONWATERTIGHT DRY MEASURES. - ~~Rape seed shall be used as the testing medium for nonwatertight dry measures. A dry measure shall be tested either volumetrically using rape seed as a testing medium or geometrically through~~ inside measurement and calculation.**

**SECTION 5.54 TAXIMETERS CODE**

**354 VC UPDATE FOR ELECTRONIC TAXIMETERS**

(This item was adopted.)

A draft revision of the Taximeter Code has been received with the objective of updating the code for electronic taximeters and recognizing current features. The revised code is contained in Appendix C to this report.

The Committee recommends the adoption of the revised Taximeters Code.

**SECTION 5.55 TIMING DEVICES CODE**

**355 VC SHORTWAVE FREQUENCIES**

(This item was adopted.)

A proposal was received that this code include a statement giving the shortwave frequencies over which WWV and WWVH broadcasts. This would eliminate the need to reference another document to determine broadcast times and frequencies.

The Committee believes this information would be helpful and recommends that a new note be added providing this information. The Committee recommends that a new paragraph N.2. be added to read:

**N.2. BROADCAST TIMES AND FREQUENCIES.- Time and frequency standards are broadcast by the following stations.**

<u>Station</u>	<u>Location, Latitude, Longitude</u>	<u>Frequency (MHz)</u>	<u>Times of Transmission (UTC)</u>
WWV	Fort Collins,	2.5	Continuous
	Colorado	5.0	
	40°41' N	10.0	
	105°02' W	15.0	
WWVH	Kauai, Hawaii	2.5	Continuous
	21°59' N	5.0	
	159°46' W	15.0	
CHU	Ottawa, Canada	3.330	Continuous
	45°18' N	7.335	
	75°45' W	14.670	

\*From NBS Special Publication 559, "Time and Frequency Users' Manual," 1979.

**Section 5.56 GRAIN MOISTURE METERS CODE**

**356-1 V PROPOSED CHANGES AND ADDITIONS**

(This item was adopted.)

Meetings were held with representatives of the USDA Federal Grain Inspection Service to discuss changes to Handbook 44 to address the needs of grain moisture measurement. Several new requirements should be introduced to improve the accuracy of grain moisture meters and to promote their proper use in determining grain moisture. The Committee received suggestions during the Interim Meeting to modify the original proposals to allow the operating range information to be marked on the grain moisture meter rather than requiring the meter to have its operating limits listed as part of the meter operation. The changes are summarized below.

**Summary of Proposals**

1. Require an indication or a marking on the device and the posting of the relevant information in a manner visible to the customer, to let the device operator and customers know when:
  - a meter is outside its operating moisture range, and
  - the sample temperature (a) differs from the meter temperature by more than 20 °F or (b) is outside the temperature range specified by the manufacturer.
2. The value of the indicated or recorded moisture division shall be not greater than 0.1 percent.
3. Define the range of power supply voltage, battery voltage, power interruptions over which the meter shall operate, and require a level-indicating means.
4. Specify the temperature operating range to be -10 to 40 °C unless otherwise stated.

5. Establish a "warm-up" requirement.
6. Add User Requirements for (a) maintaining a meter in level, (b) precluding the use of the meter if the grain temperature differs from the meter temperature by more than 20 °F, and (c) require the use of current calibration charts.

The Committee believes that it would be beneficial from an accuracy consideration that the meter not indicate any values when it is operating outside its established measurement range; however, the Committee recognizes the practical aspects of the grain industry in processing transactions in a timely manner. The recommended requirements can be implemented on a nonretroactive basis for all grain moisture meters; it is not necessary to make them nonretroactive on the basis of type. Operating range information marked only on the device may not be visible to the customer. The customer should have access to this information in case the device operator is using the device outside its normal operating range. The Committee believes that the operating range of the meter, with respect to the temperature and grain moisture limits, must also be posted. The Committee recommends adding a user requirement, UR.3.11., to this effect. The Committee also recommends that UR.3.1. be amended to reflect the current practice that operating instructions are normally available, but not posted, in the vicinity of the meter.

The Committee recommends the following changes to the Grain Moisture Meters Code for adoption.

1. Amend S.1.6.2. Operating Range to read:

~~S.1.6.2. OPERATING RANGE - Provision shall be made for clearly indicating when the operating range of the moisture meter has been exceeded - (e.g., an indicating light, not displaying a moisture value, or flashing the displayed value).~~  
A meter shall automatically and clearly indicate when the operating range of the meter has been exceeded or the manufacturer shall:

- a) clearly and conspicuously mark the operating ranges on the meter; or
- b) furnish the operating ranges of the meter and the means to clearly and conspicuously display this information on or immediately adjacent to the device.

The operating range shall specify the following:

- (a) the temperature range over which the meter may be used and still comply with the applicable requirements;
- (b) the moisture range for each grain or seed for which the meter is to be used;
- (c) the temperature range for each grain or seed for which the meter is to be used; and
- (d) the maximum allowable difference in temperature between the meter and the sample for which an accurate moisture determination can be made.

Examples of clearly indicating these conditions include an error indication, or flashing the displayed moisture value, or blanking the display.

(Nonretroactive as of January 1, 1989)

2. Add a new paragraph for direct reading grain moisture meters, section S.1.6.3. to read:

**S.1.6.3. VALUE OF MINIMUM INDICATION** - The value of the minimum indicated or recorded moisture indication shall not be greater than 0.1 percent.

3. Add new paragraphs applicable to conventional and direct reading devices:

**S.1.7. ELECTRIC POWER SUPPLY.**

**S.1.7.1. POWER SUPPLY, VOLTAGE AND FREQUENCY.**

- (a) A meter that operates using alternating current must perform within the tolerances defined in Section T.2. - Tolerance Values over the line voltage range 100-130 volts, or 200-250 volts rms as designed, and over the frequency range of 59.5 to 60.5 Hz.
- (b) Battery-operated instruments shall not indicate or record values outside the applicable tolerance limits when battery power output is excessive or deficient.

(Nonretroactive as of January 1, 1989)

**S.1.7.2. POWER INTERRUPTION** - A power interruption shall not cause an indicating or recording element to display or record any values outside the applicable tolerance limits.

(Nonretroactive as of January 1, 1989)

**S.1.8. LEVEL INDICATING MEANS** - A meter shall be equipped with level-indicating means if its performance is changed by an amount greater than the absolute value of the acceptance tolerance when the meter is moved from a level position and zeroed in a position that is out of level in any upright direction by up to five percent (approximately three degrees).

The level-indicating means shall be readable without removing any meter parts requiring a tool.

(Nonretroactive as of January 1, 1989)

**S.1.9. OPERATING TEMPERATURE:**

- (a) A meter shall not display or record any usable values until the operating temperature necessary for accurate determination has been attained, or the meter shall bear a conspicuous statement adjacent to the indication stating that the meter shall be turned on for a time period specified by the manufacturer prior to use.
- (b) A meter shall meet the requirements of T.2. - Tolerance Values when operated in the temperature range of 35 °F to 104 °F (2 °C to 40 °C) or within the range specified by the meter manufacturer.
- (c) If the manufacturer specifies a temperature range, the range shall be at least 20 °F and shall be marked on the device.

(Nonretroactive as of January 1, 1989)



4. Amend UR.3.1. to read:

**UR.3.1. OPERATING INSTRUCTIONS.** - ~~There shall be conspicuously posted or displayed-~~ The operating instructions for the use of ~~a~~ the grain moisture meter shall be readily available to the user, service technician, and weights and measures official at the place of installation. It shall include a list of accessory equipment, conversion and correction charts if any are required to obtain moisture content values, and the kinds of grain or seed to be measured with the moisture meter.

5. Add user requirements UR.3.8., UR.3.9., UR.3.10., and UR.3.11. to read:

**UR.3.8. LEVEL CONDITION** - If equipped with a level indicator, a meter shall be maintained in a level condition.

**UR.3.9. OPERATING LIMITATION** - Unless otherwise specified by the meter manufacturer, moisture determinations shall not be made when the difference in temperatures between the grain sample and the meter exceeds 20 °F.

**UR.3.10. CURRENT CALIBRATION CHART OR DATA** - Grain moisture determinations shall be made using only the most recently published calibration charts or calibration data.

**UR.3.11. POSTING OF METER OPERATING RANGE.** - The operating range of the grain moisture meter shall be clearly and conspicuously posted in the place of business and be readily visible from a reasonable customer position. The posted information shall include the following:

- (a) The temperature range over which the meter may be used and still comply with the applicable requirements. If the temperature range varies for different grains or seed, the range shall be specified for each.
- (b) The moisture range for each grain or seed for which the meter is to be used.
- (c) The temperature range for each grain or seed for which the meter is to be used.
- (d) The maximum allowable difference in temperature that may exist between the meter and the sample for which an accurate moisture determination can be made.

#### 356-2 V S.3. ACCESSORY EQUIPMENT

(This item was adopted.)

The Committee recommends that the following changes be made to specify the resolution and accuracy of the thermometer used to determine the temperature of grain samples when a separate thermometer is needed to make a temperature correction for the moisture determination.

A tolerance of 1 °F, which represents 0.05 percent moisture on a Motomo meter, is recommended. This would enable the Federal Grain Inspection Service to use the Handbook 44 tolerance for thermometers in their applications. This is a stringent tolerance and will



require weights and measures officials to have adequate reference thermometers against which to test the thermometers used with grain moisture meters. Total immersion, rather than partial immersion, thermometers are required to obtain the accuracy necessary for this purpose. Partial immersion thermometers under NBS or ASTM specifications will not be adequate following the 3:1 ratio principle that Handbook 44 requires between the tolerance of the field standard and the tolerance for the device under test. The ASTM 63 and 64F thermometers could be used as field reference standards; they currently list for \$55 to \$70. To use them correctly, a thermos bottle of 10-inch length would be needed to provide a bath for the inspector to use to compare his thermometer with the thermometers being tested. Checking thermometers that are built into the meters and cannot be removed is always a problem, whether partial or total immersion thermometers are specified.

To clarify the accuracy required for the field reference standard used to check the thermometer or temperature-sensing equipment used to determine the temperature of grain samples, rewrite N.1.3. to read:

**N.1.3. TEMPERATURE MEASURING EQUIPMENT.**- The accuracy of accessory temperature measuring equipment shall be determined by comparison with a calibrated laboratory-thermometer temperature sensor, that is such as a total immersion thermometer with 0.2 °F (0.1 °C) subdivisions, indicating over a range of from 32 °F to 104 °F (0 °C to 40 °C) with a maximum error of 2-°F (1-°C) ±0.2 °F (±0.1 °C). Tests shall be conducted at two temperatures using liquid baths (e.g., ice water and room temperature water). The two temperatures selected shall not exceed the range of temperatures identified in the moisture meter operating instructions.

Amend S.3.2. to read:

**S.3.2. THERMOMETERS OR OTHER TEMPERATURE SENSING EQUIPMENT.-**

- (a) The temperature sensing equipment or thermometer shall be designed so as to be in direct contact with a grain sample in a closed container. A thermometer inserted through a small hole in the lid of the container used to hold the grain sample is acceptable.
- (b) A separate thermometer or other temperature sensing equipment shall have temperature divisions not greater than the temperature increments used by the manufacturer in the correction table.

Add a new paragraph T.4. to read:

**T.4. THERMOMETERS OR OTHER TEMPERATURE SENSING EQUIPMENT. -**  
The tolerance for a separate thermometer or temperature sensing equipment used to determine the temperature of grain samples for the purpose of making temperature corrections in moisture determinations shall be  $\pm 1$  °F.

**360-1 I ELECTRIC WATTHOUR METER CODE**

The electric watthour meter code contained in the 1987 report has been edited and reorganized to follow the format of Handbook 44. Copies are available from the Office of Weights and Measures.

The Committee received comments from the Electricity Metering Committee of the American National Standards Institute (ANSI) advising against the adoption of this code for technical reasons. These comments were received after the Interim Meeting, so the Committee

has not yet had the opportunity to review them adequately. In addition, the proposed code does not contain requirements for the electronic watt-hour meters now entering the market. The ANSI Committee is working on requirements appropriate for electronic watt-hour meters.

Due to the concerns expressed by the ANSI Committee and the absence of requirements for electronic watt-hour meters, the Committee agreed that it is premature to propose the draft Watt-hour Meters Code as a tentative code. The Committee will carry this item over to 1989, review the ANSI standards for watt-hour meters, and monitor progress on the development of requirements for electronic watt-hour meters. The Committee requests comments from all interested parties to determine the best course of action to be taken by the Conference.

### 360-2 I CARBON DIOXIDE LIQUID METER CODE

The Committee was informed that measuring devices other than positive displacement meters are sometimes used to measure liquid carbon dioxide under applications addressed in this code. Since the code may need modification to apply to other devices, the Committee is carrying this item over to 1989. Copies of the draft Code are available from the Office of Weights and Measures.

### 360-3 I STAGE II VAPOR RECOVERY

The Committee has been requested to propose regulations, device specifications, and test procedures for Stage II vapor recovery systems. Several areas in the country are establishing requirements for Stage II systems. The Committee is not proposing any changes to the Handbook, but recommends that all jurisdictions adopt the California regulations and accept for use in their jurisdiction the equipment on which California has conducted type evaluations and that have valid California Certificates of Approval. The California requirements and procedures are contained in Appendix D.

### 360-4 I REPORT ON OIML ACTIVITIES

The following information was provided by O. K. Warnlof, Office of Standards Management, NBS.

#### PS7 Weighing Instruments (responsibility: USA)

The activities of each Reporting Secretariat (RS) under the Pilot Secretariat (PS) 7 are discussed below.

#### RS5 Automatic Weighing Instruments (responsibility: UK)

Two subjects are being addressed: railroad track scales used to weigh in motion, and automatic hopper scales. At the conclusion of the last meeting of the International Working Group (IWG) held in November, 1987, the RS circulated the third pre-draft on each of these subjects to the collaborating nations for a vote of acceptance. The United States was opposed to both, and both failed.

The fourth pre-draft on each of these subjects was circulated to all members of the PS7 U.S. National Working Group (USNWG) on January 15, 1988. Revisions to IR 50 Belt Weighers were also received from the RS and circulated to the IWG. Comments had to be returned to the RS by March 31, 1988. A meeting of the USNWG was held to prepare a

U.S. position on these documents.

The meeting of the IWG to discuss these documents was held April 18 to 22, 1988 at National Physical Laboratory (NPL) in Teddington, England, the new location of the UK Weights and Measures.

The schedule was as follows:

Tuesday, March 15, Automatic Hopper Scales  
Wednesday, March 16, Dynamic Railway Track Scales  
Thursday, March 17, Belt Scales

None of the three documents was accepted by the IWG by the conclusion of the meeting and, as a result, 5th pre-drafts on hopper scales and railway track scales, and a 2nd draft revision on IR 50 will be prepared by the U.K. and circulated for comment by October of this year.

At previous meetings of the IWG, the U.S. delegation has included Fred Gerk, New Mexico, Dick Pforr, FGIS, and Otto Warnlof. Representatives of the railroad industry have also provided comments on the railway track scale pre-drafts. At this meeting to U.S. delegation included R. Helmick, Arizona, and Paul Chase, Ramsey Engineering.

#### RS 2 Electronics (responsibility: USA)

Draft IR74 "Electronic Weighing Instruments" was accepted by CIML (International Committee for Legal Metrology) in April 1986 with only a provisional acceptance of the durability tests therein. Before the document is submitted to the 1988 Conference for sanction, it is the responsibility of the RS to resolve the issue of durability tests. After polling all the member nations for their views, the USNWG at its last meeting in October, 1987 decided that it would be better not to reference any durability tests when submitting the document to the Conference, but rather keep the heading and insert the following:

This annex is intended to specify the durability tests for electronic weighing instruments. At the time of adoption of the IR it was not yet possible to include the appropriate durability tests.

This was submitted to the IWG for a vote, and the returns are as follows: Of the 19 participating members, 15 responded. Twelve voted to "delete" and three to "maintain." The three responses to maintain were from the Federal Republic of Germany (FRG), France, and the UK. France and the FRG hold the Co-Reporting Secretariats for RS4 and the UK has the responsibility for RS5. Of the nine observer members, four responded, all to "maintain". Electronic requirements have been included in the new combined IR (discussed in the report of PS7/RS4 below); they are based on the requirements of Draft IR74. Even though PS7/RS2 "Electronics" has voted to withdraw the two durability tests in IR74, France and the FRG wish to maintain durability tests in the new combined IR. This problem has been forwarded to BIML, and we expect that the situation will be clarified.

Work on IR74 and ID11 "Electronic Measuring Instruments" (the latter document applying to all weighing and measuring instruments) must continue. A joint meeting of the two RS's involved, PS7/RS2 (USA) and PS2/RS6 (Netherlands) was held the week of May 16 through 20, 1988 in Copenhagen. The U.S. delegation included Fred Katterheinrich and William Paull, Hobart, Inc.

At the meeting of PS2/RS6, the major revisions to ID 11 that were agreed upon are as follows:

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- The spikes test was deleted.
- The recommended tests for harmonics and magnetic fields were not included but the titles will remain with the notation that they are still under consideration.
- By a vote of 8 to 3, the five durability tests recommended by Denmark (high heat-55 °C -10 days, humidity - 93 % - 40 °C - 10 days, corrosion, random vibration, and sinusoidal vibration) will not be included in the document, but the titles will be listed so that these tests may be referenced in other OIML documents.

At the meeting of PS7/RS2, the major revisions to IR 74 that were agreed upon are as follows:

- Revisions were made to reflect the changes that were made to ID 11.
- The two provisional durability tests were deleted, but the titles remain with the notation that appropriate durability tests could not be recommended at this time.

### RS4 Non-automating Weighing Instruments (responsibility: FRG and France)

The major activity of this RS has been to combine IR's 3, 28, and 74 into a single document. A companion activity has been the work of the Nordic Task Group, which had developed test procedures and report forms for inclusion in this document. At the June 1987 meeting of the IWG in June, the combined document, including the test procedures and report forms, was provisionally accepted by the IWG of both the RS and the PS. Four issues were then circulated to all of the collaborating nations for vote. The results of that vote have been incorporated into what is now referred to as "Draft IR - Non-automatic Weighing Instruments" (number to be assigned after adoption by the 1988 International Conference). The Draft was submitted to the CIML members for vote and was accepted. Austria and the U.S. (on the basis that the durability tests were included in the document) voted not to accept the document. The issue of durability tests still needs to be resolved. The United States has been represented by a number of individuals, including Daryl Tonini, SMA, Fred Katterheinrich, Hobart, Ed Bratle, NCR, Ken Butcher, MD, and Ross Andersen, NY. The documents have also been distributed for comment to the USNWG.

One of the principal problems with the document is the handling of "zero" and "tare". The issues surrounding these two functional characteristics will continue to be a problem in legal metrology. The constraints on the operational characteristics and the method of specifying these in the form of requirements are generally not consistent with the views of most representatives in the United States. Consequently, work will probably continue even if this document is accepted by the Conference in 1988.

### RS8 Load Cells (responsibility: US)

In January 1987, the United States sent a memo to the collaborating nations and Liaison International Institutions requesting their views on revisions to IR60 Load Cells. The USNWG met in June 1987, reviewed their responses, and prepared recommended revisions which were then forwarded to the IWG for comment. The USNWG met again on January 11, 1988, reviewed the responses received, and prepared their final recommendations for revision. This, along with some additional comments received from the collaborators, was forwarded to the IWG on February 4, 1988. This revision was discussed by the IWG at its meeting, held at NPL in Teddington, England, April 13 - 15, 1988, and was accepted. The major revisions include a humidity test and the decision as to conformance with the maximum permissible errors will be based on the average of the results of the 3 test



runs at each temperature level rather than the results at each test point. The U.S. delegation included J. Elengo, Revere Corp., P. Perino, Transducers, Inc., Maarten Spoor, Precision Force, Inc., and K. Yee, NBS.

Symbols (responsibility: BIML)

Some time ago, the United States was asked by BIML for its views on the development of symbols within OIML; this request was circulated to the USNWG. BIML also sent a draft document on symbols that was circulated to the USNWG PS7 and PS5. Another document from BIML is expected.

PS5D Dynamic Measurement of Volume of Liquids (responsibility: FRG)

Two significant developments with respect to PS5D are as follows:

PS5D/RS6 Electronics (responsibility: France)

A second pre-draft IR applicable to electronic liquid-measuring devices was circulated in April, 1987. The USNWG met August 25 and 26, 1987 and prepared lengthy comments. It was decided that the United States would not send a delegate to the meeting of the IWG that was held in Paris in November 1987, but a U.S. company representative was able to attend as an observer. A third pre-draft is expected.

PS5D/RS10 Direct Mass Flow Measurement of Quantities of Liquids (responsibility: US)

CIML created a new RS in September, 1987. On the basis of an inquiry to interested parties, the United States volunteered and was selected as the responsible nation for the reporting secretariat. At a meeting held December 8, 1987, a USNWG was formed and a work plan developed. A committee was selected to develop a first pre-draft to be circulated to the USNWG by March 1, 1988. The USNWG met on May 24, 1988 to finalize the first pre-draft. The draft has been circulated to the USNWG for their approval prior to circulation to the collaborating nations. A first meeting of the IWG is tentatively scheduled for the Spring of 1989.

K. Butcher, Maryland, Chairman

R. Andersen, New York

R. Helmick, Arizona

J. Truex, Ohio

D. Watson, Texas

H. Oppermann, NBS, Technical Advisor

COMMITTEE ON SPECIFICATIONS AND TOLERANCES



## APPENDIX A

### SEC. 3.30. LIQUID-MEASURING DEVICES

#### A. APPLICATION

A.1. - This code applies to:

- (a) devices used for the measurement of liquids, including liquid fuels and lubricants, and
- (b) wholesale devices used for the measurement and delivery of agri-chemical liquids such as fertilizers, feeds, herbicides, pesticides, insecticides, fungicides, and defoliants.  
(Added 1985)

A.2. - This code does not apply to:

- (a) meters mounted on vehicle tanks (see Sec. 3.31. Code for Vehicle-Tank Meters),
- (b) devices used for dispensing liquefied petroleum gases (see Sec. 3.32. Code for Liquefied Petroleum Gas Liquid-Measuring Devices),
- (c) devices used for dispensing other liquids that do not remain in a liquid state at atmospheric pressures and temperatures,
- (d) water meters, or
- (e) devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges.

A.3. - In addition to the requirements of this code, liquid-measuring devices shall meet the requirements of Section 1.10. General Code.

S. SPECIFICATIONS

S.1. INDICATING AND RECORDING ELEMENTS AND  
RECORDED REPRESENTATIONS.

S.1.1. GENERAL. - A liquid-measuring device:

- (a) shall be equipped with a primary indicating element, and
- (b) may be equipped with a primary recording element.

S.1.2. UNITS. - A liquid-measuring device shall indicate, and record if the device is equipped to record, its deliveries in gallons, quarts, pints, pounds, kilograms, or binary-submultiples or decimal subdivisions of the gallon. The indication of a delivery indicated in units of mass (pounds, kilograms) shall be expressed as "apparent mass versus a density of  $8.0 \text{ g/cm}^3$ "; that is, as the mass of a reference material having a density of  $8.0 \text{ g/cm}^3$  that would produce the same balance (scale) indication as the actual liquid would produce if it were being measured at  $20^\circ\text{C}$  in air with a density of  $1.2 \text{ mg/cm}^3$ .  
(Amended 1987)

S.1.2.1. RETAIL MOTOR-FUEL DEVICES. - Deliveries shall be indicated and recorded, if the device is equipped to record, in liters or gallons and decimal subdivisions or fractional equivalents thereof.  
(Added 1979)

S.1.2.2. AGRI-CHEMICAL LIQUID DEVICES.

S.1.2.2.1. LIQUID MEASURE. - Deliveries shall be indicated and recorded in liters or gallons and decimal subdivisions or fractional equivalents thereof.

S.1.2.2.2. MASS MEASURE. - Deliveries shall be indicated and recorded in kilograms or pounds and decimal subdivisions or fractional equivalents thereof.  
(Added 1986)

S.1.2.3. VALUE OF SMALLEST UNIT. - The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed the equivalent of:

- (a) one pint on retail devices;
- (b) one gallon or ten pounds on wholesale devices.

This requirement does not apply to manually operated devices equipped with stops or stroke-limiting means.  
(Amended 1983 and 1986)

S.1.3. ADVANCEMENT OF INDICATING AND RECORDING ELEMENTS. - It shall not be possible to advance primary indicating and recording elements except by the mechanical operation of the device. Clearing a device by advancing its elements to zero is permitted, but only if:

- (a) once started, the advancement movement cannot be stopped until zero is reached, and

- (b) in the case of indicating elements only, such elements are automatically obscured until the elements reach the correct zero position.

#### S.1.4. GRADUATIONS.

S.1.4.1. LENGTH. - Graduations shall be varied in length so that they may be conveniently read.

S.1.4.2. WIDTH. - In a series of graduations, the width of:

- (a) every graduation shall be at least 0.008 inches but not greater than the minimum clear interval between graduations, and
- (b) main graduations shall be not more than 50 percent greater than the width of subordinate graduations.

S.1.4.3. CLEAR INTERVAL BETWEEN GRADUATIONS. - The clear interval between graduations shall be not less than 0.04 inch. If the graduations are not parallel, the measurement shall be made:

- (a) along the line of movement of the tip of the index of the indicator as it passes over the graduations, or
- (b) if the indicator extends over the entire length of the graduations, at the point of widest separation of the graduations.

#### S.1.5. INDICATORS.

S.1.5.1. SYMMETRY. - The portion of the index of an indicator associated with the graduations shall be symmetrical with respect to the graduations.

S.1.5.2. LENGTH.

- (a) If the indicator and the graduations are in different planes, the index of the indicator shall extend to each graduation with which it is to be used.
- (b) If the indicator is in the same plane as the graduations, the distance between the index of the indicator and the ends of the graduations, measured along the line of the graduations, shall be not more than 0.04 inch.

S.1.5.3. WIDTH.

- (a) The index of an indicator shall not be wider than the width of the widest graduation.
- (b) If the index of an indicator extends over the entire length of a graduation, it shall be of uniform width throughout the portion that coincides with the graduation.

S.1.5.4. CLEARANCE. - If the indicator and the graduations are in different planes, the clearance between the index of an indicator and the plane of the graduations shall be no greater than 0.06 inch.

S.1.5.5. PARALLAX. - Parallax effects shall be reduced to the practical minimum.

S.1.6. OPERATING REQUIREMENTS, RETAIL DEVICES (EXCEPT SLOW FLOW METERS).

S.1.6.1. INDICATION OF DELIVERY. - The device shall automatically show on its face the initial zero condition and the quantity delivered (up to the nominal capacity).

However, the first 0.009 gallon (or 0.03 liter) of a delivery and its associated total sales price need not be indicated.

(Amended 1982)

S.1.6.2. PROVISIONS FOR POWER LOSS.

S.1.6.2.1. TRANSACTION INFORMATION. - In the event of a power loss, the information needed to complete any transaction in progress at the time of the power loss (such as the quantity and unit price, or sales price) shall be determinable for at least 15 minutes at the dispenser or at the console if the console is accessible to the customer.

S.1.6.2.2. USER INFORMATION. - The device memory shall retain information on the quantity of fuel dispensed and the sales price totals during power loss.

[Nonretroactive as of January 1, 1983.]

S.1.6.3. RETURN TO ZERO.

(a) The primary indicating elements, and primary recording elements if the device is equipped to record, shall be readily returnable to a definite zero indication. However, a key-lock operated or other self-operated device may be equipped with cumulative indicating or recording elements, provided that it is also equipped with a zero-return indicating element.

(b) It shall not be possible to return primary indicating elements, or primary recording elements beyond the correct zero position.

(Amended 1972)

S.1.6.4. DISPLAY OF UNIT PRICE AND PRODUCT IDENTITY.

S.1.6.4.1. UNIT PRICE. - A computing or money-operated device shall be able to display on each face the unit price at which the device is set to compute or to dispense.

S.1.6.4.2. PRODUCT IDENTITY.

(a) A device shall be able to conspicuously display on each side the identity of the product being dispensed.

- (b) A device designed to dispense more than one grade, brand, blend, or mixture of product also shall be able to display on each side the identity of the grade, brand, blend, or mixture being dispensed.

#### S.1.6.5. MONEY-VALUE COMPUTATIONS.

- (a) A computing device shall be capable of computing the sales price for one or more unit prices for every delivery possible within either the measurement range of the device or the range of the computing elements, whichever is less.
- (b) The analog sales price indicated for any delivered quantity shall not differ from a mathematically computed price (quantity x unit price = total sales price) by an amount greater than the value in Table 1.

(Amended 1984)

S.1.6.5.1. MONEY-VALUE DIVISIONS, ANALOG. - The values of the graduated intervals representing money values on a computing type device shall be those in Table 1.

Table 1.  
MONEY-VALUE DIVISIONS AND  
MAXIMUM ALLOWABLE VARIATIONS FOR MONEY-VALUE  
COMPUTATIONS ON MECHANICAL ANALOG COMPUTERS

Unit Price		Money Value Division	Maximum Allowable Variation	
From	To and including		Design Test	Field Test
0 0.25/liter	\$ 1.00/gallon or	1¢	± 1¢	± 1¢
\$1.00/gallon or 0.25/liter	\$ 3.00/gallon or 0.75/liter	1¢ or 2¢	± 1¢	± 1¢
\$3.00/gallon or 0.75/liter	\$10.00/gallon or 2.50/liter	1¢ or 2¢	± 1¢	± 2¢
\$3.00/gallon or 0.75/liter	\$10.00/gallon or 2.50/liter	5¢	± 2 1/2¢	± 5¢



S.1.6.5.2. MONEY-VALUE DIVISIONS, DIGITAL. - A computing type device with digital indications shall comply with the requirements of paragraph G.S.5.5. Money Values, Mathematical Agreement, and the total price computation shall be based on quantities not exceeding 0.01-gallon intervals for devices indicating in inch-pound units and 0.05 liter for devices indicating in metric units.

(Added 1980)

S.1.6.5.3. AUXILIARY ELEMENTS. - If a system is equipped with auxiliary indications, all indicated money value divisions of the auxiliary element shall be identical with those of the primary element.

[Nonretroactive and enforceable as of January 1, 1985.]

S.1.6.6. AGREEMENT BETWEEN INDICATIONS. - When a quantity value indicated or recorded by an auxiliary element is a derived or computed value based on data received from a retail motor fuel dispenser, the value may differ from the quantity value displayed on the dispenser, provided the following conditions are met:

- (a) all total money values for an individual sale that are indicated or recorded by the system agree, and
- (b) within each element, the values indicated or recorded meet the formula (quantity x unit price = total sales price) to the closest cent.

[Nonretroactive as of January 1, 1988.]

(Added 1985) (Amended 1987)

S.1.6.7. RECORDED REPRESENTATIONS, POINT OF SALE SYSTEMS. - The sales information recorded by cash registers when interfaced with a retail motor-fuel dispenser shall contain the following information for products delivered by the dispenser:

- (a) the total volume of the delivery,
- (b) the unit price,
- (c) the total computed price, and
- (d) the product identity by name, symbol, abbreviation, or code number.

[Nonretroactive as of January 1, 1986.]

(Added 1985)

S.1.6.8. LUBRICANT DEVICES, TRAVEL OF INDICATOR. - The indicator shall move at least one inch in relation to the graduations, if provided, for a delivery of one pint.

S.1.7. OPERATING REQUIREMENTS, WHOLESALE DEVICES ONLY.

S.1.7.1. TRAVEL OF INDICATOR. - A wholesale device shall be readily operable to deliver accurately any quantity from 50 gallons or 500 pounds to the capacity of the device. If the most sensitive element of the indicating system utilizes an indicator and graduations, the relative movement of these parts corresponding to a delivery of 1 gallon or 10 pounds shall be not less than 0.20 inch.

(Amended 1987)

S.1.7.2. MONEY VALUES-MATHEMATICAL AGREEMENT. - Any digital money-value indication and any recorded money value on a computingtype device shall be in mathematical agreement with its associated quantity indication or representation to within one cent of money value.

S.2. MEASURING ELEMENTS.

S.2.1. VAPOR ELIMINATION.

(a) A liquid-measuring device shall be equipped with a vapor or air eliminator or other automatic means to prevent the passage of vapor and air through the meter.

(b) Vent lines from the air or vapor eliminator shall be made of metal tubing or other rigid material.

(Amended 1975)

S.2.2. PROVISION FOR SEALING. - Adequate provision shall be made for applying security seals in such a manner that no adjustment may be made of:

(a) any measurement element, or

(b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries.

The adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

S.2.3. DIRECTIONAL FLOW VALVES. - Valves intended to prevent reversal of flow shall be automatic in operation.

S.2.4. STOP MECHANISM.

S.2.4.1. INDICATION. - The delivery for which the device is set shall be conspicuously indicated.

(Amended 1983)

S.2.4.2. STROKE LIMITING ELEMENTS. - Stops or other stroke limiting elements subject to direct pressure or impact shall be:

(a) made secure by positive, nonfrictional engagement of these elements; and

(b) adjustable to provide for deliveries within tolerances.

(Amended 1983)

S.2.4.3. SETTING. - If two or more stops or other elements may be selectively brought into operation to permit predetermined quantities of deliveries,

- (a) the position for the proper setting of each such element shall be accurately defined; and
- (b) any inadvertent displacement from the proper setting shall be obstructed.

(Amended 1983)

S.2.5. ZERO-SET-BACK INTERLOCK, RETAIL MOTOR-FUEL DEVICES - A device shall be constructed so that:

- (a) after a delivery cycle has been completed by moving the starting lever to any position that shuts off the device, an automatic interlock prevents a subsequent delivery until the indicating elements, and recording elements if the device is equipped and activated to record, have been returned to their zero positions;
- (b) the discharge nozzle cannot be returned to its designed hanging position (that is, any position where the tip of the nozzle is placed in its designed receptacle and the lock can be inserted) until the starting lever is in its designed shut-off position and the zero-set-back interlock has been engaged; and
- (c) in a system with more than one dispenser supplied by a single pump, an effective automatic control valve in each dispenser prevents product from being delivered until the indicating elements on that dispenser are in a correct zero position.

(Amended 1981 and 1985)

S.2.6. TEMPERATURE DETERMINATION, WHOLESALE DEVICES EXCEPT MASS FLOW DEVICES. - For test purposes, means shall be provided to determine the temperature of the liquid either:

- (a) in the liquid chamber of the meter, or
- (b) immediately adjacent to the meter in the meter inlet or discharge line.  
[Nonretroactive as of January 1, 1985.]  
(Added 1984; Amended 1986)

S.2.7. WHOLESALE DEVICES EQUIPPED WITH AUTOMATIC TEMPERATURE COMPENSATORS.

S.2.7.1. AUTOMATIC TEMPERATURE COMPENSATION. - A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to the volume at 60 °F.

S.2.7.2. PROVISION FOR DEACTIVATING. - On a device equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of gallons compensated to 60 °F, provision shall be made for deactivating the automatic temperature-compensating mechanism so that the meter can indicate, and record if it is equipped to record, in terms of the uncompensated volume.  
(Amended 1972)

S.2.7.3. PROVISION FOR SEALING AUTOMATIC TEMPERATURE COMPENSATOR. - Provision shall be made for applying security seals in such a manner that an automatic temperature-compensating system cannot be disconnected and that no adjustment may be made to the system without breaking the seal.

S.2.7.4. TEMPERATURE DETERMINATION WITH AUTOMATIC TEMPERATURE COMPENSATION. - For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

- (a) in the liquid chamber of the meter, or
- (b) immediately adjacent to the meter in the meter inlet or discharge line.

(Amended 1987)

S.2.8. EXHAUSTION OF SUPPLY, LUBRICANT DEVICES OTHER THAN METER TYPES. - When the level of the supply of lubricant becomes so low as to compromise the accuracy of measurement, the device shall:

- (a) become inoperable automatically, or
- (b) give a conspicuous and distinct warning.

S.2.9. MASS FLOW METERS. - An automatic means to determine and correct for changes in product density shall be incorporated in any mass flow metering system that is affected by changes in the density of the product being measured.  
(Added 1987)

### S.3. DISCHARGE LINES AND VALVES.

S.3.1. DIVERSION PROHIBITED. - It shall not be possible to divert any measured liquid from the measuring chamber of the meter or its discharge line.

S.3.2. MULTIPLE DELIVERY OUTLETS. - Two or more delivery outlets may be installed only if automatic means are provided to ensure that:

- (a) liquid can flow from only one outlet at a time, and
- (b) the direction of flow for which the mechanism may be set at any time is clearly and conspicuously indicated.

S.3.3. FUELING OF TRUCKS. - Two outlets may be operated simultaneously on devices for the fueling of trucks only if diversion of flow to other than the receiving vehicle cannot readily be accomplished and is readily apparent. Allowable deterrents include, but are not limited to, physical barriers to adjacent driveways, visible valves, or lighting systems that indicate which outlets are in operation, and explanatory signs.

S.3.4. EXCEPTIONS. - The provisions of S.3.2. and S.3.3. shall not apply to measuring devices if all discharge outlets designed to operate simultaneously are 1-1/2 inches in diameter or larger.  
(Amended 1982)

S.3.5. PUMP-DISCHARGE UNIT. - A pump-discharge unit equipped with a flexible discharge hose shall be of the wet-hose type.

S.3.6. GRAVITY-DISCHARGE UNIT. - On a gravity-discharge unit:

- (a) the discharge hose or equivalent pipe shall be of the dry-hose type with no shutoff valve at its outlet end unless the hose or pipe drains to the same level under all conditions of use;
- (b) the dry hose shall be sufficiently stiff and only as long as necessary to facilitate drainage;
- (c) an automatic vacuum breaker, or equivalent mechanism, shall be incorporated to prevent siphoning and to ensure rapid and complete drainage; and
- (d) the inlet end of the hose or outlet pipe shall be high enough to ensure complete drainage.

S.3.7 DISCHARGE HOSE. - A discharge hose shall be reinforced so that the performance of the device is not affected by the expansion or contraction of the hose.

S.3.8. DISCHARGE VALVE. - A discharge valve may be installed in the discharge line only if the device is of the wet-hose type. Any other shutoff valve on the discharge side of the meter shall be of the automatic or semiautomatic predetermined-stop type or shall be operable only:

- (a) by means of a tool (but not a pin) entirely separate from the device, or
- (b) by mutilation of a security seal with which the valve is sealed open.

S.3.9. ANTIDRAIN VALVE. - In a wet-hose, pressure-type device, an antidrain valve shall be incorporated in or immediately adjacent to the discharge valve to prevent the drainage of the discharge hose.

#### S.4. MARKING REQUIREMENTS.

S.4.1. LIMITATION ON USE. - The limitations on its use shall be clearly and permanently marked on any device intended to measure accurately only:

- (a) products having particular properties; or



- (b) under specific installation or operating conditions; or
- (c) when used in conjunction with specific accessory equipment.

S.4.2. AIR PRESSURE. - If a device is operated by air pressure, the air pressure gauge shall show by special graduations or other means the maximum and minimum working pressures recommended by the manufacturer.

#### S.4.3. WHOLESALE DEVICES.

S.4.3.1. DISCHARGE RATES. - A wholesale device shall be marked to show its designed maximum and minimum discharge rates. However, the minimum discharge rate shall not exceed 20 percent of the maximum discharge rate.

S.4.3.2. TEMPERATURE COMPENSATION. - If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recorded representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 60 °F.

S.4.4. RETAIL DEVICES. - On a retail device with a designed maximum discharge rate of 25 gallons (100 L) per minute or greater, the maximum and minimum discharge rates shall be marked on an exterior surface of the device and shall be visible after installation. The minimum discharge rate shall not exceed 20% of the maximum discharge rate.

[Nonretroactive as of Jan. 1, 1985.]

(Added 1984)

## N. NOTES

### N.1. TEST LIQUID.

N.1.1. TYPE OF LIQUID. - The liquid used for testing a liquid-measuring device shall be the type the device is used to measure, or another liquid with the same general physical characteristics.

N.1.2. LABELING. - Following the completion of a successful examination of a wholesale device, the weights and measures official should attach a label or tag indicating the type of liquid used during the test.

N.2. VOLUME CHANGE. - Care shall be taken to minimize changes in volume of the test liquid due to temperature changes and evaporation losses.

### N.3. TEST DRAFTS.

N.3.1. RETAIL PISTON-TYPE AND VISIBLE-TYPE DEVICES. - Test drafts shall include the full capacity delivery and each intermediate delivery for which the device is designed.

N.3.2. SLOW FLOW METERS. - Test drafts shall be equal to at least four times the minimum volume that can be measured and indicated through either a visible indication or an audible signal.

N.3.3. LUBRICANT DEVICES. - Test drafts shall be 1 quart. Additional test drafts may include 1 pint, 4 quarts, and 6 quarts.

N.3.4. OTHER RETAIL DEVICES. - On devices with a designed maximum discharge rate of:

- (a) less than 20 gallons (80 L) per minute, tests shall include drafts of one or more amounts, including a draft of at least 5 gallons.
- (b) 20 gallons (80 L) per minute or greater, tests shall include drafts of one or more amounts, including a draft of at least the amount delivered by the device in one minute at the maximum flow rate of the installation.

(Amended 1984)

N.3.5. WHOLESALE DEVICES. - Test drafts should be equal to at least the amount delivered by the device in one minute at its maximum discharge rate, and shall in no case be less than 50 gallons or 500 pounds.

(Amended 1987)

#### N.4. TESTING PROCEDURES.

N.4.1. NORMAL TESTS. - The "normal" test of a device shall be made at the maximum discharge rate developed under the conditions of installation.

N.4.1.1. WHOLESALE DEVICES EQUIPPED WITH AUTOMATIC TEMPERATURE-COMPENSATING SYSTEMS. - On wholesale devices equipped with automatic temperature compensating systems, normal tests shall be conducted;

- (a) by comparing the compensated volume indicated or recorded to the actual delivered volume corrected to 60 °F; and
- (b) with the temperature compensating system deactivated, comparing the uncompensated volume indicated or recorded to the actual delivered volume.

The first test shall be performed with the automatic temperature-compensating system operating in the "as found" condition.

On devices that indicate or record both the compensated and uncompensated volume for each delivery, the tests in (a) and (b) may be performed as a single test.

(Amended 1987)

N.4.2. SPECIAL TESTS. - "Special" tests, to develop the operating characteristics of a liquid-measuring device and any special elements and accessories attached to or associated with the device, shall be made as circumstances require. Any test except as set forth in N.4.1. shall be considered a special test.

N.4.2.1. SLOW-FLOW METERS. - A "special" test shall be made at a flow rate:

- (a) not larger than twice the actual minimum flow rate, and

- (b) not smaller than the actual minimum flow rate of the installation.

#### N.4.2.2. RETAIL MOTOR-FUEL DEVICES.

- (a) Devices with a flow-rate capacity less than 25 gallons (100 L) per minute shall have a "special" test performed at the slowest of the following rates:
  - (1) 5 gallons (19 L) per minute, or
  - (2) the minimum discharge rate marked on the device, or
  - (3) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting.
- (b) Devices marked with a flow-rate capacity of 25 gallons (100 L) or more per minute, shall have "special" test performed at the slower of the following:
  - (1) the minimum discharge rate marked on the device, or
  - (2) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting.

(Added 1984)

#### N.4.2.3. OTHER RETAIL DEVICES. - "Special" tests of other retail devices shall be made at the slower of the following rates:

- (a) 50 percent of the maximum discharge rate developed under the conditions of installation, or
- (b) the minimum discharge rate marked on the device.

#### N.4.2.4. WHOLESALE DEVICES. - "Special" tests shall be made to develop the operating characteristics of a measuring system and any special association or attached elements and accessories. "Special" tests shall include a test at the slower of the following rates:

- (a) 20 percent of the marked maximum discharge rate; or
- (b) the minimum discharge rate marked on the device.

#### N.4.3. MONEY-VALUE COMPUTATION TESTS.

##### N.4.3.1. LABORATORY TESTS. - When testing the device in the laboratory:

- (a) compliance with paragraph S.1.6.5. MONEY-VALUE COMPUTATIONS shall be determined by using the cone gear as a reference for the total quantity delivered;
- (b) the indicated quantity shall agree with the cone gear representation with the index of the indicator within the width of the graduation; and

- (c) the maximum allowable variation of the indicated sales price shall be as shown in Table 1.  
(Amended 1984)

N.4.3.2. FIELD TESTS. - In the conduct of field tests to determine compliance with paragraph S.1.6.5., the maximum allowable variation in the indicated sales price shall be as shown in Table 1.  
(Amended 1984) (Added 1982)

N.5. TEMPERATURE CORRECTION ON WHOLESALE DEVICES. - Corrections shall be made for any changes in volume resulting from the differences in liquid temperatures between time of passage through the meter and time of volumetric determination in the prover. When adjustments are necessary, appropriate petroleum measurement tables should be used.  
(Amended 1974)

## T. TOLERANCES

T.1. APPLICATION TO UNDERREGISTRATION AND TO OVERREGISTRATION. - The tolerances hereinafter prescribed shall be applied to errors of underregistration and errors of overregistration, whether or not a device is equipped with an automatic temperature compensator.

### T.2. TOLERANCE VALUES.

#### T.2.1. RETAIL DEVICES EXCEPT SLOW-FLOW METERS.

##### T.2.1.1. DEVICES INDICATING IN INCH-POUND UNITS.

- (a) The maintenance tolerance on normal and special tests shall be one cubic inch plus one cubic inch per indicated gallon and never less than 2 cubic inches.
- (b) The acceptance tolerance on normal and special tests shall be 1/2 cubic inch plus 1/2 cubic inch per indicated gallon and never less than 1 cubic inch.

(Amended 1981 and 1986)

##### T.2.1.2. DEVICES INDICATING IN METRIC UNITS.

- (a) The maintenance tolerance on normal and special tests, shall be 20 milliliters, plus 4 milliliters per indicated liter, and never less than 40 milliliters.
- (b) The acceptance tolerance on normal and special tests shall be 10 milliliters, plus 2 milliliters per indicated liter and never less than 20 milliliters.
- (c) The tolerance applied to a 19-liter draft shall be that tolerance applicable to a 20-liter draft.

(Amended 1981 and 1986)

T.2.2. SLOW-FLOW METERS. - Maintenance tolerances and acceptance tolerances shall be as shown in Table 2.

T.2.3. WHOLESALE DEVICES AND MASS FLOW METERS.

T.2.3.1. MEASUREMENT OF AGRI-CHEMICAL LIQUIDS. - Maintenance tolerances and acceptance tolerances shall be:

- |     |                                       |      |
|-----|---------------------------------------|------|
| (a) | On normal tests                       |      |
|     | Acceptance tolerance                  | 0.5% |
|     | Maintenance tolerance                 | 1.0% |
| (b) | On special tests                      |      |
|     | Acceptance and maintenance tolerances | 1.0% |

Table 2.  
TOLERANCES FOR SLOW-FLOW METERS

Indication	Normal tests		Special tests			
	Maintenance tolerance		Acceptance tolerance		Maintenance and acceptance tolerance	
	Percent	(Minims)	Percent	(Minims)	Percent	(Minims)
1 gill	1.0	(20)	0.75	(15)	1.25	(25)
0.05 gallon	1.0	(30)	0.75	(25)	1.25	(40)
1/2 pint	1.0	(40)	0.75	(30)	1.25	(50)
0.10 gallon	1.0	(60)	0.75	(45)	1.25	(75)
1 pint	1.0	(75)	0.75	(60)	1.25	(95)
0.20 gallon	1.0	(120)	0.75	(90)	1.25	(155)
		(fl drams)		(fl drams)		(fl drams)
1 quart	1.0	(2-1/2)	0.75	(2)	1.25	(3)
1/2 gallon	0.75	(4)	0.60	(3)	1.0	(5)
1 gallon and over	0.75	( 8 per gallon)	0.60	( 6 per gallon)	1.0	(10 per gallon)



T.2.3.2. MEASUREMENT OF OTHER LIQUIDS. - Maintenance tolerances and acceptance tolerances shall be:

- (a) On normal tests
 

Acceptance tolerance	0.2%
Maintenance tolerance	0.3%
  - (b) On special tests
 

Acceptance and maintenance tolerances	0.5%
---------------------------------------	------
- (Amended 1986 and 1987)

T.2.3.3. AUTOMATIC TEMPERATURE COMPENSATING SYSTEMS. - The difference between the meter error for results determined with and without the automatic temperature compensating system activated shall not exceed 0.2 percent of the test draft. The results of each test shall be within the applicable acceptance or maintenance tolerance.  
[Nonretroactive as of January 1, 1987.]  
(Added 1987)

## UR. USER REQUIREMENTS

### UR.1. SELECTION REQUIREMENTS.

#### UR.1.1. DISCHARGE HOSE.

UR.1.1.1. LENGTH. - The length of the discharge hose on a retail motor-fuel device:

- (a) shall be measured from its housing or outlet of the discharge line to the inlet of the discharge nozzle;
- (b) shall be measured with the hose fully extended if it is coiled or otherwise retained or connected inside a housing; and
- (c) shall not exceed 18 feet unless it can be demonstrated that a longer hose is essential to permit deliveries to be made to receiving vehicles or vessels.

An unnecessarily remote location of a device shall not be accepted as justification for an abnormally long hose.

(Amended 1972 and 1987)

#### UR.1.1.2. MARINAS AND AIRPORTS.

UR.1.1.2.1. LENGTH. - The length of the discharge hose shall be as short as practicable, and shall not exceed 50 feet unless it can be demonstrated that a longer hose is essential.

UR.1.1.2.2. PROTECTION. - Discharge hoses exceeding 26 feet in length shall be adequately protected from weather and other environmental factors when not in use.

(Made retroactive 1974 and amended 1984)

## UR.2. INSTALLATION REQUIREMENTS.

UR.2.1. MANUFACTURER'S INSTRUCTIONS. - A device shall be installed in accordance with the manufacturer's instructions, and the installation shall be sufficiently secure and rigid to maintain this condition.  
(Added 1987)

UR.2.2. DISCHARGE RATE. - A device shall be installed so that the actual maximum discharge rate will not exceed the rated maximum discharge rate. Automatic means for flow regulation shall be incorporated in the installation if necessary.

UR.2.3. SUCTION HEAD. - A piston-type device shall be installed so that the total effective suction head will not be great enough to cause vaporization of the liquid being dispensed under the highest temperature and lowest barometric pressure likely to occur.

UR.2.4. DIVERSION OF LIQUID FLOW. - A motor-fuel device equipped with two delivery outlets used exclusively in the fueling of trucks shall be so installed that any diversion of flow to other than the receiving vehicle cannot readily be accomplished and is readily apparent.

## UR.2.5. PRODUCT STORAGE IDENTIFICATION.

- (a) The fill connection for any petroleum product storage tank or vessel supplying motor fuel devices shall be permanently, plainly, and visibly marked as to product contained.
- (b) When the fill connection device is marked by means of a color code, the color code key shall be conspicuously displayed at the place of business.

(Added 1975 and amended 1976)

## UR.3. USE OF DEVICE.

UR.3.1. RETURN OF INDICATING AND RECORDING ELEMENTS TO ZERO. - On any dispenser used in making retail deliveries, the primary indicating element, and recording element if so equipped, shall be returned to zero before each delivery.

Exceptions to this requirement are totalizers on key-lock operated or other self-operated dispensers and the primary recording element if the device is equipped to record.

## UR.3.2. UNIT PRICE AND PRODUCT IDENTITY.

- (a) The following information shall be conspicuously displayed on the face of a retail dispenser used in direct sale:
  - (1) the unit price at which the product is offered for sale; and
  - (2) in the case of a computing type or money-operated type, the unit price at which a computing type or money-operated dispenser is set to compute and deliver.
- (b) The following information shall be conspicuously displayed on the each

side of a retail dispenser used in direct sale:

- (1) the identity of the product in descriptive commercial terms, and
- (2) in the case of a dispenser designed to dispense more than one grade, brand, blend, or mixture of product, the identity of the grade, brand, blend, or mixture that a multiproduct dispenser is set to compute and deliver.

(Amended 1972, 1983, 1987)

UR.3.3. PRINTED TICKET. - The total price, the total volume of the delivery, and the price per gallon or liter shall be shown, either printed or in clear hand script, on any printed ticket issued by a device of the computing type and containing any one of these values.

UR.3.4. STEPS AFTER DISPENSING. - After delivery to a customer from a retail motor-fuel device:

- (a) the starting lever shall be returned to its shutoff position and the zero-set-back interlock engaged; and
- (b) the discharge nozzle shall be returned to its designed hanging position unless the primary indicating elements, and recording if the device is equipped and activated to record, have been returned to a definite zero indication.

UR.3.5. TEMPERATURE COMPENSATION, WHOLESALE.

UR.3.5.1. AUTOMATIC.

UR.3.5.1.1. WHEN TO BE USED. - If a device is equipped with an automatic temperature compensator, it shall be connected, operable, and in use at all times. The automatic temperature compensator may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.

UR.3.5.1.2. INVOICES.

- (a) A written invoice based on a reading of a device that is equipped with an automatic temperature compensator shall show that the volume delivered has been adjusted to the volume at 60 °F.
- (b) The invoice issued from an electronic wholesale device equipped with an automatic temperature compensating system shall also indicate the API gravity, specific gravity, or coefficient of expansion for the product, product temperature, and gross reading.

(Amended 1987)

UR.3.5.2. NONAUTOMATIC.

UR.3.5.2.1. TEMPERATURE DETERMINATION. - If the volume of the product delivered is adjusted to the volume at 60 °F, the product temperature shall be taken during the delivery in:

- (a) the liquid chamber of the meter, or
- (b) the meter inlet or discharge line adjacent to the meter, or
- (c) the compartment of the receiving vehicle at the time it is loaded.

UR.3.5.2.2. INVOICES. - The accompanying invoice shall indicate that the volume of the product has been adjusted for temperature variations to a volume at 60 °F and shall also state the product temperature used in making the adjustment.

D. DEFINITIONS OF TERMS

The terms defined here have a special and technical meaning when used in the Code for Liquid-Measuring Devices.

**apparent mass versus 8.0 g/cm<sup>3</sup>.** The apparent mass of an object versus 8.0 g/cm<sup>3</sup> is the mass of material of density 8.0 g/cm<sup>3</sup> that produces exactly the same balance reading as the object when the comparison is made in air with a density of 1.2 mg/cm<sup>3</sup> at 20 °C.

**binary submultiples.** See General Code for definition.

**clear interval (minimum clear interval).** See General Code definition for "minimum clear interval between graduations". The term "minimum clear interval" is the shortest distance between adjacent graduations when the graduations are not parallel.

**computing type device.** See General Code for definition.

**discharge line.** A rigid pipe connected to the outlet of a measuring device.  
(Added 1987)

**discharge hose.** A flexible hose connected to the discharge outlet of a measuring device or its discharge line.  
(Added 1987)

**dispenser.** See motor-fuel device.

**dry hose.** A discharge hose intended to be completely drained at the end of each delivery of liquid. [See "dry-hose type".]

**dry-hose type.** A type of device in which it is intended that the discharge hose be completely drained following the mechanical operations involved in each delivery. [See "dry hose".]

**face.** That portion of a computing-type pump or dispenser which displays the actual computation of price per unit, delivered quantity, and total sale price. In the case of some electronic displays, this may not be an integral part of the pump or dispenser.

(Added 1987)

**graduation.** See General Code for definition.

**gravity type.** A type of device designed for discharge by gravity.

**index of an indicator.** See General Code for definition.

**liquid fuel.** Any liquid used for fuel purposes, that is, as a fuel, including motor fuel.

**liquid-fuel device.** A device designed for the measurement and delivery of liquid fuels.

**liquid-measuring device.** A mechanism or machine designed to measure and deliver liquid by definite volume. Means may or may not be provided to indicate automatically, for one of a series of unit prices, the total money value of the liquid measured, or to make deliveries corresponding to specific money values at a definite unit price.

**lubricant.** See General Code for definition.

**lubricant device.** A device designed for the measurement and delivery of liquid lubricants, including, but not limited to, heavy gear lubricants and automatic-transmission fluids (automotive).

**mass flow meter (device).** A device that measures the mass of a product flowing through the system. The mass measurement may be determined directly from the effects of mass on the sensing unit or may be inferred by measuring the properties of the product, such as the volume, density, temperature, or pressure, and displaying the quantity in mass units.

(Added 1987)

**motor fuel.** Liquid used as fuel for internal-combustion engines.

**motor-fuel device (motor-fuel dispenser; retail motor-fuel device).** A device designed for the measurement and delivery of liquids used as fuel for internal-combustion engines. The term "motor-fuel dispenser" means the same as "motor-fuel device"; the term "retail motor-fuel device" applies to a unique category of device (see definition of "retail device").

**parallax.** See General Code for definition.

**pressure type (device).** A type of device designed for operation with the liquid under artificially produced pressure.

**primary indicating element.** See General Code for definition.

**primary recording element.** See General Code for definition.

**retail device.** A device designed for single deliveries of less than 100 gallons and, in addition, any device designed or used for retail deliveries of motor fuels to in-



dividual highway vehicles.

**side.** That portion of a pump or dispenser which faces the consumer during the normal delivery of product.

(Added 1987)

**slow-flow meter.** A retail device designed for the measurement, at very slow rates (less than 10 gallons per hour), of liquid fuels at individual domestic installations.

**test liquid.** The liquid used during the test of a device.

**tolerance.** See General Code for definition.

**visible type.** A type of device in which the measurement takes place in a see-through glass measuring chamber.

**wet hose.** A discharge hose intended to be full of liquid at all times. [See "wet-hose type".]

**wet-hose type.** A type of device designed to be operated with the discharge hose full of liquid at all times. [See "wet hose".]

**wholesale device.** Any device other than a retail device. [See "retail device".]

## APPENDIX B

### Technical Committee on National Type Evaluation Metering Industry Sector Meeting Summary January 13, 1988

The discussions held during the meeting are summarized below. The recommendations resulting from the meeting are underlined. All references are to National Conference on Weights and Measures Publication 14, "NTEP Criteria and Procedures."

#### I. Type Evaluation Checklist for Liquid Measuring Devices

The Committee recommended changes to several items on the type evaluation checklist for liquid measuring devices.

##### Item 1 Power Back-up, Page 196, No. 8

Forms of power other than a "battery power back-up" are available to maintain required information during a power loss to a measuring device. The Committee therefore suggests that the NTEP application form for measuring devices be generalized by deleting the term "battery," the title for No. 8 then reading "Power Back Up."

##### Item 2 Fixed Zero, Page 203, No. 6(c)

Concern was expressed about the need for a fixed zero after the decimal point, particularly on cash register consoles and sales receipts.

The Committee noted that it is desirable to prevent a device from appearing to have a greater resolution than it actually possesses. This requirement is probably more critical for weighing devices than for gasoline dispensers: members of the Committee could not cite any problems with dispensers that comply with the current requirement and do not believe that there is need for a fixed zero to appear on the dispenser.

The Committee agreed that a fixed zero may appear after the decimal point on a receipt if the console/cash register system cannot distinguish whether the last digit in a data stream (transmitted data) is fixed or active. Active digits must still agree and have mathematical agreement. The Committee recommends that the footnote on page 203 be changed to read:

- \* A fixed zero may appear after a decimal point on a receipt and/or console if the system cannot distinguish whether the digit is fixed or active.

**Item 3    Selectable Unit Price Capability, Page 219, No. 3**

The Committee concluded that the unit price should be retained until payment has been made, allowing adequate time for completion of the transaction. A proposal of 30 seconds was considered unacceptable since it may not provide sufficient time in which to complete all transactions.

The Committee recommends that the wording of No. 3 be changed to read:

3.    the selected unit price is displayed until the transaction is completed (payment has been settled) or the start of the next transaction, whichever occurs first.

Committee members expressed concern about the effect this would have on "stacked" sales. It was noted that such wording would not detrimentally affect a stacked sale, since the start of the next transaction is initiated by authorizing the dispenser for the next transaction.

**II.    Permanence Tests on Wholesale and Vehicle Tank Meters**

The permanence tests for wholesale and vehicle tank meters were inadvertently omitted from NCWM Publication 14. The Committee agreed that, since permanence tests were previously agreed upon by the Committee, the criterion should be added. The throughput requirement is:

2,000 x maximum rate of flow for wholesale and vehicle tank meters.

**III.    Permanence Test Procedures for Meters**

**Item 1    Initial Examination, Page 271, No. 2**

The Committee discussed wording to clarify the procedure to be followed when only one product is available for testing and to indicate how the Certificate of Conformance would reflect this situation. The Committee agreed that unleaded regular gasoline would be the first choice of product for the test; however, no differentiation should be made between grades of gasoline. Rewording would also clarify that, although only one meter for each of two products is chosen for throughput testing, the remaining meters would still be tested. The Committee recommends the following:

2.    At least one meter will be chosen for throughput on each of two major products (e.g., unleaded gasoline and diesel fuel). At least two tests at both the fast and slow flow rates will be run on each of these two meters. Only one test at each flow rate need be run on any remaining meters. If both products are not available for the type evaluation, the test may be performed using one product and a Provisional Certificate of Conformance may be issued for the one product. The test using the other product may be performed at a later date to result in a full Certificate of Conformance.

Item 2 Subsequent Examination, Page 272, No. 2 and No. 3

Because the meter(s) initially chosen for throughput testing have more tests run than other meters at the station, the same meter(s) should be selected for subsequent examination. The Committee agreed to modify No. 2 as follows:

2. The examination will be conducted no sooner than 20 days after the initial examination and not before at least 20,000 gallons have been measured by the meters previously chosen for throughput testing.

No. 3 : Consistent with the proposed change in No. 2, the Committee agreed to modify No. 3 as follows:

3. Two tests at both fast and slow rates will be made on the throughput meters. Only one test at each flow rate need be run on any remaining meters.

Item 3 Card Activated Systems, Pages 273-275

Page 273, Paragraph 1: The time limit referenced in the first paragraph addresses the period between the authorization of the dispenser by means of the card and turning on the dispenser. This time should be limited to reduce the potential for fraudulent activities. The proposed criteria set a maximum time of three minutes for this limit. The Committee considered a request for 255 seconds, but concluded that 255 seconds was excessive and unnecessary.

The Committee recommends the following:

- a. A card activated system shall have an upper limit of 3 minutes on the time between authorization and "handle on" at the dispenser and shall properly record transactions on the appropriate card account.

Page 273, Paragraph 2: Part (b) currently states "When a power loss occurs after the pump 'handle' is on, the dispenser must deauthorize immediately." Use of the word "immediately" has caused concern, especially if the power is quickly restored to the system.

Since most manufacturers wish delivery to be continued after a momentary power failure and recognize that some time is needed to verify that a dispenser is not responding to commands, the Committee recommends the establishment of a time limit for the power loss.

Committee members felt that the time period should not exceed 10 seconds so that a customer using the system before a power loss would not leave the dispenser while it was still authorized. A suggested period of 2 - 3 seconds was considered to be too short because a console may need to repeatedly poll the dispensers to determine if a problem exists. If the console does not receive information or have contact from the dispenser within a specifiable period of time, the console automatically shuts the dispenser down; this process sometimes takes about 10 seconds.

The Committee agreed that a time limit of 10 seconds would be reasonable and would not compromise the integrity of a customer's transaction.

The Committee recommends that the first sentence in the second paragraph read:

When a card-activated system is subjected to a power loss greater than 10 seconds, the dispenser shall deauthorize.

**Page 273-274, Parts (b) through (d):** The Committee recommends the following changes be made to better follow the progression of testing and to specify a time limit for power loss:

- 1) Move part (d) to part (b), and reletter as appropriate.
- 2) Sections will now read:
  - b)** If the time limit to deactivate a dispenser is programmable, it shall not accept an entry greater than three minutes.
  - c)** When a power loss greater than 10 seconds occurs after the pump 'handle' is on, the dispenser must deauthorize.
  - d)** When there is a loss of power, but the pump 'handle' is not on, the dispenser must deauthorize in not more than three minutes.

**Page 274, Test Methods -- Tests No. 3 and No. 6:**

**Test 3:** The Committee recommends changing Test 3 to read:

- a. Authorize and dispense with card #1.
- b. Allow the system to time out and deauthorize (if it does).
- c. Do not turn off the 'handle'.
- d. Authorize and dispense with card #2.
- e. The transactions shall be properly recorded for each card.

**Test 6:** The Committee recommends the addition of a new Test No. 6 (Tests currently numbered 6, 7, and 8 will be renumbered 7, 8, and 9):

6.
  - a. Authorize with card #1 (do not turn 'handle' on) and interrupt power for at least 10 seconds. This should deauthorize the dispenser.
  - b. Resupply power, turn 'handle' on, and try to dispense. The dispenser should not dispense.

#### **IV. LMD Type Evaluation Permanence Test Procedure**

The Committee briefly discussed an alternative proposal to the conduct and analysis of type evaluation permanence tests on metering devices. The approach is significantly different from what has been used in the past. Further development will proceed before a formal proposal is presented to the Committee.



## APPENDIX C

### SEC. 5.54. TAXIMETERS

#### A. APPLICATION

A.1. This code applies to taximeters; that is, to devices that automatically calculate at a predetermined rate or rates and indicate the charge for hire of a vehicle.

A.2. This code does not apply to odometers on vehicles that are rented on a distance basis (for which see Sec. 5.53 Code for Odometers). (Amended 1977)

A.3. See also Sec. 1.10; General Code requirements.

#### S. SPECIFICATIONS

##### S.1. DESIGN OF INDICATING AND RECORDING ELEMENTS.

S.1.1. GENERAL. - A taximeter shall be equipped with a primary indicating element and may be equipped with a recording element.

S.1.2. ADVANCEMENT OF INDICATING ELEMENTS. - Except when a taximeter is being cleared, the primary indicating and recording elements shall be susceptible of advancement only by ~~the rotation~~ the movement of the vehicle wheels or by the time mechanism.

S.1.3. VISIBILITY OF INDICATIONS. - The indications of fare, including extras, and the mode of operation, such as "time" or "hired", shall be constantly displayed whenever the meter is in operation. All indications of passenger interest shall be easily read from a distance of four feet under any condition of normal operation.  
(Amended 1977 and 1986)

S.1.3.1. MINIMUM HEIGHT OF FIGURES, WORDS, AND SYMBOLS. -  
The minimum height of the figures used to indicate the fare shall be 10 and for extras, 8 mm. The minimum height of the figures, words, or symbols used for other indications, including those used to identify or define, shall be 3.5 mm.  
(Added 1986)

S.1.3.2. LIGHTING OF INDICATIONS. Integral lighting shall be provided for illuminating the fare indications, operational controls, and other indications of passenger interest (vacant, hired, time off, etc.).  
(Nonretroactive as of January 1, 1989)

S.1.4. ACTUATION OF FARE-INDICATING MECHANISM. - When a taximeter designed to calculate fares upon the basis of a combination of distance traveled and time elapsed is operative with respect to fare indication, the fare-indicating mechanism shall be actuated by the distance mechanism whenever the vehicle is in motion at such a speed that the rate of distance revenue equals or exceeds the time rate, and may be actuated by the time mechanism whenever the vehicle speed is less than this and when the vehicle is not in motion. Means shall be provided for the vehicle operator to render the time mechanism either operative or inoperative with respect to the fare-indicating mechanism.  
(Amended 1977)

S.1.5. OPERATING CONDITION.

~~S.1.5.1. GENERAL. - Whenever the indicating elements of a taximeter are set to indicate a charge for the hire of the vehicle, the character of the fare indication shall be clearly shown on the taximeter face. When a taximeter is cleared, the indication "Not Registering", "Vacant" or an equivalent expression shall be shown. Whenever a taximeter is set so as to register charges, it shall indicate "Registering," "Hired," or an equivalent expression and the rate at which it is set shall be automatically indicated (Rate 1 or Rate A for example).~~

~~S.1.5.2.- SINGLE-TARIFF-TAXIMETER. -- Whenever a single-tariff taximeter is set to register charges, it shall indicate "Registering", "Hired" or an equivalent expression.~~

~~S.1.5.3.- MULTIPLE-TARIFF-TAXIMETER.-- Whenever a multiple-tariff taximeter is set to register charges, it shall show the basis for the particular tariff for which it is set. The indication "Registering", "Hired" or an equivalent expression may be shown for the lowest tariff. For any tariff rate higher than the lowest, there shall be shown the type of tariff that actually is being charged ("3 or more persons," for example).~~

~~S.1.5.4. S.1.5.2. TIME NOT RECORDING. - When a taximeter is set for fare registration with the time mechanism inoperative, it shall indicate "Time Not Recording" or an equivalent expression. This indication may replace the indication specified for a single-tariff taximeter and for the lowest rate on a multiple-tariff taximeter, but shall be in addition to the indication specified for the higher rates on a multiple-tariff taximeter.~~

S.1.6. FARE IDENTIFICATION. - Fare indications shall be identified by the word "Fare" or by an equivalent expression. Values shall be defined by suitable words or monetary signs.

S.1.7. EXTRAS. - ~~If an extras mechanism is provided, extras~~ Extras shall be indicated as a separate item and shall not be included in the fare indication. They shall be identified by the word "Extras" or by an equivalent expression. Values shall be defined by suitable words or monetary signs. Means may be provided to totalize the fare and extras if the totalized amount returns to separate indications of fare and extras within five seconds or less.

S.1.7.1. **NONUSE OF EXTRAS.** - If and when taximeter extras are prohibited by legal authority or are discontinued by a vehicle operator, with respect to all taximeters involved the extras mechanisms shall be rendered inoperable or the extras indications shall be effectively obscured by permanent means.

S.1.8. **PROTECTION OF INDICATIONS.** - Indications of fare and extras shall be displayed through and entirely protected by glass or other suitable transparent material securely attached to the housing of the taximeter.

S.1.9. **DESIGN OF RECORDING ELEMENTS.** - A recording element shall be equipped to record date, time, and fare. On a taximeter equipped with extras indications, the recording element shall also record extras.  
(Nonretroactive as of January 1, 1989)

S.2. **BASIS OF FARE CALCULATIONS.** - A taximeter shall calculate fares only upon the basis of:

- (a) distance traveled,
- (b) time elapsed, or
- (c) a combination of distance traveled and time elapsed.  
(Amended 1977)

S.3. **DESIGN OF OPERATING CONTROL.**

~~S.3.1- **MEANS OF CONTROL.** - A control lever, arm, knob, handle, or other convenient and effective means shall be provided to set the taximeter mechanism for the desired operating condition and to "clear" the taximeter.~~

S.3.1. **POSITIONS OF CONTROL.** The several positions of the operating controls shall be clearly defined and shall be so constructed that accidental or inadvertent changing of the operating condition of the taximeter is improbable. Movement of the operating controls to an operating position immediately following movement to the cleared position shall be delayed enough to permit the taximeter to come to a complete rest in the cleared position.

~~S.3.2- **POSITIONS OF CONTROL.** - The several positions of the control lever shall be mechanically defined, and displacement from any one of these positions shall be sufficiently obstructed that the accidental or inadvertent changing of the operating condition of the taximeter is improbable. - Possible movement of this control to an operating position immediately following its movement to the cleared position shall automatically be delayed enough to permit the taximeter mechanism to come to complete rest in the cleared condition.~~

~~S.3.3- S.3.2. **FLAG.** - If the control for the operating condition is a lever-arm and flag, the flag shall be at its highest position when the taximeter is cleared, and in this position the whole of the flag shall be above the level of the taximeter housing.~~

~~S.3.4- S.3.3. **CONTROL FOR EXTRAS MECHANISM.** - The knob, handle, or other means provided to actuate the extras mechanism shall be inoperable whenever the taximeter is cleared.~~

S.4. INTERFERENCE. - The ~~construction~~ design of a taximeter shall be such that there will be no interference between the time and the distance portions of the mechanism device at any speed of operation ~~corresponding to a vehicle speed faster than the speed at which the basic rate of distance revenue equals the basic waiting time rate; specifically, the registration of a taximeter in the "hired" condition shall agree with its performance in the "time not recording" condition within 1 percent.~~ --  
(Amended 1977)

S.5. PROVISION FOR SECURITY SEALS. - Adequate provision shall be made for affixing ~~lead-and-wire~~ security seals to a taximeter and to other parts required for service operation of a complete installation on a vehicle, so that no adjustments, alterations, or replacements affecting ~~in any way~~ the accuracy or indications of the device or the assembly can be made without mutilating the seal or seals. The sealing means shall be such that it is not necessary to disassemble or remove any part of the device or of the vehicle to apply or inspect the seals.

S.6. SHORT TERM POWER INTERRUPTION, ELECTRONIC TAXIMETERS. After a power interruption of 10 seconds or less, the fare and extras indications shall return to the previously displayed indications and may be susceptible of advancement without the taximeter being cleared.

S.7. LONG TERM POWER INTERRUPTION, ELECTRONIC TAXIMETERS. After a power interruption exceeding 10 seconds, the fare and extras indications shall return to the previously displayed indications and shall not be susceptible of advancement until the taximeter is cleared. [Nonretroactive as of January 1, 1989. Retroactive after January 1, 1994.]

## N. NOTES

### N.1. DISTANCE TESTS.

N.1.1. TEST METHODS. - To determine compliance with distance tolerances, a distance test of a taximeter shall be conducted utilizing one or more of the following test methods:

- (a) ROAD TEST. - A road test consists of driving the vehicle over a precisely measured road course.
- (b) FIFTH-WHEEL TEST. - A fifth-wheel test consists of driving the vehicle over any reasonable road course and determining the distance actually traveled through the use of a mechanism known as a "fifth wheel" that is attached to the vehicle and that independently measures and indicates the distance.
- (c) SIMULATED-ROAD TEST. - A simulated road test consists of determining the distance traveled by use of a roller device, or by computation from rolling circumference and wheel-turn data.  
(Amended 1977)



N.1.2. TEST PROCEDURES. - The distance test of a taximeter, whether a road test, a simulated-road test, or a fifth-wheel test, shall include at least duplicate runs of sufficient length to cover at least the third money drop or one mile, whichever is greater, and shall be at a speed approximating the average speed traveled by the vehicle in normal service. In the case of metric-calibrated taximeters, the test should cover at least the third money drop or two kilometers, whichever is greater.  
(Amended 1977)

#### N.1.3. TEST CONDITIONS.

N.1.3.1. VEHICLE LADING. - During the distance test of a taximeter, the vehicle shall carry two persons, or in the case of a simulated-road test, 150 pounds or 70 kilograms of test weights may be substituted in lieu of the second person.

N.1.3.2. TIRE PRESSURE. - At the completion of test run or runs, the tires of the vehicle under test shall be checked to determine what the tire pressure is that operating tire pressure posted in the vehicle. If not, the tire pressure should be adjusted to the posted tire pressure and further tests may be conducted to determine the operating characteristics of the odometer.  
(Amended 1977)

N.2. TIME TEST. - If a taximeter is equipped with a mechanism timing device through which charges are made for time intervals, this mechanism the timer shall be tested at least through the first 5 time intervals. the initial interval, four separate subsequent intervals, and an average time test of at least four consecutive subsequent time intervals.

N.3. INTERFERENCE TEST. - If a taximeter is equipped with a mechanism timing device through which charges are made for time intervals, a test tests shall be conducted to determine whether there is interference between the time and distance mechanisms-measure-ments. During the interference test, the vehicle is operated at a speed of 2 or 3 mi/h, or 3 or 4 km/h, faster than the speed at which the basic distance rate equals the basic time rate. The basic rate per hour divided by the basic rate per mile is the speed (mi/h or km/h) that the basic time rate and basic distance rate are equal.

### T. TOLERANCES

#### T.1. TOLERANCE VALUES.

T.1.1. ON DISTANCE TESTS. - Maintenance and acceptance tolerances for taximeters shall be as follows:

- (a) ON OVERREGISTRATION: 1 percent of the interval under test.
- (b) ON UNDERREGISTRATION: 4 percent of the interval under test, with an added tolerance of 100 ft or 30 m whenever the initial interval is included in the interval under test.



T.1.2. ON TIME TESTS.

T.1.2.1. ON INDIVIDUAL TIME INTERVALS. - Maintenance and acceptance tolerances on individual time intervals shall be as follows:

- (a) ON OVERREGISTRATION: 3 seconds per minute (5 percent).
- (b) ON UNDERREGISTRATION: 9 seconds per minute (15 percent) on the initial interval, and 6 seconds per minute (10 percent) on subsequent intervals.

T.1.2.2. ON AVERAGE TIME INTERVAL COMPUTED AFTER EXCLUDING THE INITIAL INTERVAL. - Maintenance and acceptance tolerances on the average time interval excluding the initial interval shall be as follows:

- (a) ON OVERREGISTRATION: ~~No tolerance-~~ 0 seconds
- (b) ON UNDERREGISTRATION: 3 seconds per minute (5 percent).

T.1.3. ON INTERFERENCE TESTS.

T.1.3.1. The registration of a taximeter in the "time on" position shall agree within one percent of its performance in the "time off" position.

UR. USER REQUIREMENTS

UR.1. INFLATION OF VEHICLE TIRES. - The operational tire pressure of passenger vehicles and truck tires shall be posted in the vehicle and shall be maintained at the posted pressure.  
(Amended 1977)

UR.2. POSITION AND ILLUMINATION OF TAXIMETER. - A taximeter shall be so positioned and illuminated that its indications, operational markings, and controls of passenger interest can be conveniently read by a passenger seated in the back seat of the vehicle.  
(Amended 1985 and 1986)

UR.3. STATEMENT OF RATES. - The distance and time rates for which a taximeter is adjusted, and the schedule of extras when an extras ~~mechanism~~ indication is provided, shall be conspicuously displayed inside the vehicle ~~front and rear passenger compartments~~. The words "Rate", "Rates" or "Rates of Fare" shall precede the rate statement. The rate statement shall be fully informative, self-explanatory, and readily understandable by the ordinary passenger, and shall either be of a permanent character or be protected by glass or other suitable transparent material.  
(Amended 1977)

UR.4. REINSPECTION. - Whenever a taximeter has been damaged or repaired in any way that might affect the accuracy of its indications, or any of the official security seals have been mutilated, such device shall not thereafter be used until it has been officially examined and ~~reapproved~~ approved.

D. DEFINITIONS OF TERMS

The terms defined here have a special and technical meaning when used in the Taximeter Code.

**basic distance rate.** The charge for distance for all intervals except the initial interval.

**basic time rate.** The charge for time for all intervals except the initial interval.

**cleared.** A taximeter is "cleared" when it is inoperative with respect to all fare indication, when no indication of fare or extras is shown and when all parts are in those positions in which they are designed to be when the vehicle on which the taximeter is installed is not engaged by a passenger.

**cold-tire pressure.** The pressure in a tire at ambient temperature.

**extras.** Charges to be paid by a passenger in addition to the fare, including any charge at a flat rate for the transportation of passengers in excess of a stated number and any charge for the transportation of baggage.

**face.** That side of a taximeter on which passenger charges are indicated.

**fare.** That portion of the charge for the hire of a vehicle that is automatically calculated by a taximeter through the operation of the distance and/or time mechanism.

**fifth wheel.** A commercially-available distance-measuring device which, after calibration, is recommended for use as a field transfer standard for testing the accuracy of taximeters and odometers on rented vehicles.

**fifth-wheel test.** A distance test similar to a road test except that the distance traveled by the vehicle under test is determined by a mechanism known as a "fifth-wheel" that is attached to the vehicle and that independently measures and indicates the distance.

**flag.** A plate at the end of the lever arm or similar part by which the operating condition of a taximeter is controlled and indicated.

**hired.** A taximeter is "hired" when it is operative with respect to all applicable indications of fare or extras. The indications of fare include time and distance where applicable unless qualified by another indication of "Time Not Recording" or an equivalent expression.

**initial distance or time interval.** The interval corresponding to the initial money drop.

**money drop.** An increment of fare indication. The "initial money drop" is the first increment of fare indication following activation of the taximeter.

**multiple-tariff taximeter.** One that may be set to calculate fares at any one of two or more rates.

**operating-tire pressure.** The pressure in a tire immediately after the vehicle has been driven for at least 5 miles or 8 kilometers.

**road test.** A distance test, over a measured course, of a complete taximeter assembly when installed on a vehicle, the mechanism being actuated as a result of vehicle travel.

**rolling circumference.** The rolling circumference is the straight line distance traveled per revolution of the wheel (or wheels) that actuates the taximeter. If more than one wheel actuates the taximeter, the rolling circumference is the average distance traveled per revolution of the actuating wheels.

**simulated-road test.** A distance test during which the taximeter may be actuated by some means other than road travel. The distance traveled is either measured by a properly calibrated roller device, or computed from rolling circumference and wheel-turn data.

**single-tariff taximeter.** One that calculates fares at a single rate only.

**subsequent distance or time intervals.** The intervals corresponding to money drops following the initial money drop.

**taximeter.** A device that automatically calculates, at a predetermined rate or rates, and indicates the charge for hire of a vehicle.

## APPENDIX D

### California Requirements for Stage II Vapor Recovery (Modified to remove references to the California Codes)

#### Procedures for Type Approval and Field Compliance Testing

##### A. APPLICATION

A.1. This code applies to systems for control of gasoline vapor resulting from motor vehicle fueling operations.

A.2. The Director shall test systems specified in Subsection A.1. submitted for type approval and certification in accordance with the procedures commonly applied to the class of systems involved, and such additional tests as he determines to be necessary to assure compliance with the specifications and performance requirements contained in this article. Since systems vary depending upon their type, complexity, use and other characteristics, complete predetermined testing procedures cannot be established to determine all the variables of the system which may affect its use and performance.

Prior to formal type approval examination, the applicant shall submit information pertaining to the design of the system, including schematics, blueprints, instruction manuals, brochures, components and all other information necessary for preliminary testing. If the Director finds in preliminary testing that the system has defects in design, manufacture, service, repair, or other characteristics, he may permit the applicant to modify the system and resubmit it for further testing. After successful completion of preliminary testing, the Director will authorize the applicant to install not more than a specified number of systems in a prescribed location for use in the formal type approval examination. The Director will, in cooperation with the county sealer of weights and measures in the designated location, observe the system in operation. Such period of observation will normally be within 30 to 90 days during which periodic examinations will be conducted to determine compliance with the elements specified in specifications, notes, and tolerances below, relating to reliability and accuracy over the prescribed period. If, during or at the conclusion of the examination, the Director determines the system is failing to maintain reliability and accuracy within acceptance tolerances, the Director shall advise the applicant and may refuse further approval until such time as the defects are corrected.

A.2.1. REVOCATION OF TYPE APPROVAL. - The granting of type approval carries with it the obligation that the supplier continue to manufacture systems in accordance with the specifications submitted to the Director in order to achieve type approval, and that the systems continue to perform properly. The Director, upon his own motion, or upon the request of any weights and measures official or other interested person, may reexamine any system for which type approval has previously been granted

to determine whether such system continues to meet such requirements. If the Director finds, on a sampling basis, a characteristic defect involving more than one percent of the systems in operation in the state, the Director may initiate a proceeding under the state's Administrative Procedure Act to determine whether the type approval should be revoked or modified. Nothing herein shall prevent the Director from undertaking discussions with the manufacturer to resolve the problem in a manner which will not necessitate issuance of formal orders.

A.3. Section 1.10. General code requirements for weighing and measuring devices also apply.

## S. SPECIFICATIONS

S.1. A system covered by this article shall have:

(a) A primary nozzle shut-off, automatic in operation, to stop liquid flow when the liquid level reaches the nozzle primary-shut-off sensing mechanism.

(b) Effective means to prevent recirculation (i.e., the passage of liquid through the vapor return line) in the event of failure of the primary shut-off mechanism.

The effective means required to prevent the recirculation may include, but is not limited to, a secondary shut-off device which stops the flow of gasoline when liquid begins to recirculate through the vapor return line.

## S.2. RECIRCULATION PREVENTION

S.2.1. The recirculation prevention shut-off device specified in S.1.(b) shall activate prior to permitting the passage of liquid in excess of 3/10 gallon.

## S.3. MAXIMUM ALLOWABLE INCHES OF H<sub>2</sub>O VACUUM

Assist systems shall operate at the inches of H<sub>2</sub>O vacuum recommended by the manufacturer, but not more than -10 inches in H<sub>2</sub>O vacuum as measured at the nozzle during delivery.

## N. NOTES -- TYPE APPROVAL TESTING

### N.1. PERFORMANCE TESTING -- PRIMARY SHUT-OFF AND SECONDARY SHUT-OFF DEVICE

N.1.1. TEST METHOD. - The test to determine the acceptability of an individual nozzle will be conducted utilizing a closed test unit as specified in N.1.1.

N.1.2. TEST PROCEDURES FOR PRIMARY SHUT-OFF. - The test shall require for all deliveries proper initial automatic shut-off and, in addition, ten (10) consecutive attempts to override, with the liquid level at the nozzle primary-shut-off sensing mechanism. The attempts may be made as rapidly as the nozzle permits. All ten attempts must result in nozzle shut-off. The override test will be performed on a minimum of six nozzles and a minimum of ten tests on each nozzle during the testing process. This override test is in addition to the 300 vehicle test as specified in Section N.3.1. and the secondary shut-off device test as specified in N.1.3.

### N.1.3. TEST PROCEDURES FOR SECONDARY SHUT-OFF DEVICE

(IF EQUIPPED). - The test shall require filling the vapor return line with sufficient gasoline to activate the secondary shut-off device. The nozzle should be placed



into an empty airtight test unit at such an angle and rapidly enough so that gasoline does not have the time to drain back into storage.

An attempt should be made at this point to dispense fuel into the test unit. The attempt should result in nozzle shut-off. This test will be performed on a minimum of six nozzles and a minimum of ten tests on each nozzle during the testing process. The secondary shut-off device test is in addition to the 300 vehicle test as specified in Section N.3.1. and the primary shut-off test as specified in Section N.1.2.

## N.2. PERFORMANCE TESTING -- MEASUREMENT ACCURACY

Prior to the delivery accuracy test of vapor recovery systems,, the liquid measuring device (meter) shall be adjusted as close as practicable to zero and within the acceptance tolerance for the device.

## N.3. PERFORMANCE TESTING -- DELIVERY ACCURACY

N.3.1. TEST METHODS. - Compliance with delivery tolerance requirements will be based on observations of refueling of at least 300 vehicles under conditions representative of the anticipated range of actual field use.

N.3.1.1. TEST PROCEDURES. - Refueling operations will be observed with a liquid trap in the vapor return hose so that all liquid entering the hose can be collected and measured. Trap placement and tester actions shall be such as to produce the least possible change from normal operations. This trap shall be installed at the outlet end of the vapor hose and outside of the dispenser. The vapor return hose shall be drained into the trap after each refueling.

The vehicles should be representative of vehicles within the state, including various sizes of passenger vehicles, vans, and trucks. The test shall include varied fuel delivery rates, full service and self-serve modes, complete and partial fills, fuel types, and varied nozzle orientations.

The system shall be rejected if there is a failure of the individual delivery tolerance of 0.2 percent, as specified in Section T.1.(a). The Director may retest the system, on his own initiative or at the request of the applicant, when he determines the test was not representative of field conditions.

## N.4. PERFORMANCE TESTING -- EVAPORATION AND VOLUME CHANGE

N.4.1. TEST METHOD. - To determine the inches of H<sub>2</sub>O vacuum on assist systems, an appropriate gage, pressure transducer, or indicator will be used.

N.4.2. TEST PROCEDURE. - Install the gage, transducer, or indicator at the nozzle. The system should then be operated to determine if it is functioning within the limits as specified in Section S.3.

N.5. Type approval certification testing regarding recirculation shall include testing by an independent testing laboratory, selected by the Director, but the final test and determination shall be made by the Director.

## N. NOTES -- FIELD COMPLIANCE TESTING

### N.1. These procedures apply to field compliance testing.

N.1.1. TEST METHODS. - Tests shall be performed using fuel tanks installed in motor vehicles that are representative of vehicles within the state and/or the test unit prescribed below.

The field compliance test unit consists of a rigid metal tank approximately 13 inches high and 9 inches in diameter, with a liquid capacity of approximately 3 gallons, supported on a metal base approximately 3/16 inches thick, 6 inches wide and 17 1/2 inches long. The tank shall have a fuel fill pipe from a 1972-1974 Ford Pinto or equivalent, and shall not have an internal vent. The fill pipe shall have an outside diameter of approximately 2 1/4 inches and extend from 1/4 inch inside the tank of a length of 10 inches outside the tank at an angle of 45 degrees from horizontal. The fill pipe shall be modified to have a transparent center section at least 5 inches long that extends to not less than 2 inches from the fill inlet. All parts of the tank shall be electrically bonded together. A valve approximately 5/16 inch shall be installed at the top center of the tank and have an outlet for the attachment of a 5/16 inch hose. Handles for carrying and emptying the tank may be attached. A diagram of the unit appears herein.

N.1.1.1. TEST PROCEDURE. - Nozzles shall be inserted into the fill opening of the vehicle tank or test unit in accordance with the instructions on the device, if any, and common public usage.

N.1.1.1.2. PRIMARY SYSTEM TEST. - A primary shut-off shall occur when the nozzle is contacted by the liquid with the dispenser operating at any discharge rate but not less than the minimum rate allowed by a hold-open clip, if any, or three gallons per minute, whichever is less.

N.1.1.1.3. SYSTEM OVERRIDE. - After an original liquid activated (primary) shut-off and with the nozzle primary shut-off sensing mechanism immersed in liquid, six additional attempts to activate the nozzle shall be made as rapidly as the nozzle permits. All six attempts must result in nozzle shut-off.

N.1.1.1.4. SECONDARY, PRESSURE ACTIVATED SHUT-OFF (IF EQUIPPED). - Pour 1/10 gallon of fuel into the vapor hose, while holding as much of the hose as permitted by the installation lower than the nozzle. Rapidly place the nozzle into the empty test unit or a vehicle tank that is within three gallons of being full including the fill inlet. An automatic shut-off shall occur when the nozzle is activated.

## T. TOLERANCES

### T.1. DELIVERY ACCURACY

In a stage II vapor recovery system type approval test, the quantity of measured product entering the vapor return line during a delivery shall not exceed:

- (a) 0.2 percent of individual delivery, nor

- (b) 0.02 percent of the total fuel delivered to the 300 or more vehicles fueled during the test period.

**T.2. PRIMARY SHUT-OFF**

T.2.1. TYPE APPROVAL TESTING. - For nozzles that will allow a tight seal with the vehicle fill opening, the ten additional attempts to override the nozzle as specified in N.1.2. shall not increase the amount indicated by the dispenser by more than a total of 1/10 gallon.

T.2.2. FIELD COMPLIANCE TESTING. - For nozzles that will allow a tight seal with the vehicle fill opening, the six additional attempts to override the nozzle as specified in N.1.1.1.3. SYSTEM OVERRIDE shall not increase the amount indicated by the dispenser by more than a total of 1/10 gallon. The 1/10 gallon limit does not apply to vehicle tests.

**REPORT OF THE  
COMMITTEE ON EDUCATION, ADMINISTRATION,  
AND CONSUMER AFFAIRS**

Thomas F. Geiler, Chairman  
Sealer of Weights and Measures  
Town of Barnstable, Massachusetts

**REFERENCE  
KEY NO.**

**400 INTRODUCTION**

This is the Final Report of the Committee on Education, Administration, and Consumer Affairs for the 73rd Annual Meeting of the National Conference on Weights and Measures. The Report consists of the Interim Report offered in the Conference "Program and Committee Reports" as amended by the Addendum Sheets issued during the Annual Meeting.

The Report was adopted in its entirety by a hand vote of the membership.

Table A identifies all of the items contained in the Report by Reference Key Number, Item Title, and Page Number. All items are informational and required no formal action by the membership.

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**Table A  
REFERENCE KEY ITEMS**

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Reference Key No.		Title of Item	Page
401	I	REGIONAL WEIGHTS AND MEASURES ACTIVITIES	314
402		NATIONAL TRAINING PROGRAM (NTP)	315
402-1	I	NTP Status Report	315
402-2	I	Certification Program Implementation	317
402-3	I	Registry Summary	317

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**Table A (Continued)**  
**REFERENCE KEY ITEMS**

Reference Key No.		Title of Item	Page
402		NATIONAL TRAINING PROGRAM (NTP) (Continued)	
402-4	I	Module Revisions	317
402-5	I	Training Program Implementation	318
402-6	I	Training Module Comments and Issues	319
402-7	I	Future Funding	321
402-8	I	OWM's Training	321
402-9	I	Review of Commodity Regulations Module	321
402-10	I	Review of Production Schedule/Planning	322

In addition, the Report contains six appendices that are related to specific Reference Key Numbers as follows:

**Table B**  
**APPENDICES**

App.	Title	Reference Key No.	Page
A.	NTP Certification Summary	402-2	323
B.	NTP Registry Summary of Activity	402-3	327
C.	Letter from the Central Weights and Measures Association	401 and 402-5	333
D.	Excerpts from the General Materials Catalog of the National Safety Council	401	335
E.	Letter from Kenneth Butcher to Tom Geiler	402-6	343
F.	Memorandum for State Weights and Measures Directors from Albert Tholen	402-8	355



**DETAILS OF ALL ITEMS**  
(in order of Reference Key Number)

**401        I        REGIONAL WEIGHTS AND MEASURES ACTIVITIES**

The Committee reviewed and discussed the following:

1. The Final Report of the Education and Consumer Affairs Committee to the 30th Annual Technical Conference of the Western Weights and Measures Association (September 1987).
2. The Final Report of the Education Committee to the 42nd Annual Conference of the Southern Weights and Measures Association (November 1987).
3. A letter from James C. Truex, Chairman, Central Weights and Measures Association, on some concerns about NTP implementation that were raised during the CWMA's interim meeting in October 1987.
4. Two proposals on training that were developed by the Northeastern Weights and Measures Association Education Committee at NEWMA's interim meeting in November 1987.
5. A letter from Steven A. Malone concerning the action taken by the Central Weights and Measures Association on the Education Committee's Interim Report during the Association's annual meeting in April 1988.
6. The Final Report of the Committee on Education, Administration, and Consumer Affairs to the 16th Annual Conference of the Northeastern Weights and Measures Association (May 1988).

The report of the WWMA Education Committee, noted its plans to investigate the feasibility of improving consumer awareness through the production of public service video tapes. It is suggested that the WWMA also consider the possibility of producing video tapes on device examination to use in connection with the NCWM training modules. If the WWMA or any other group or jurisdiction does develop video tapes to be used with the modules, the NCWM Education Committee would appreciate receiving copies (or borrowing them to make a duplicate) so that it can make copies available to other jurisdictions that might like to use them. The Committee could publicize the availability of such tapes by keeping a list on the WAMIS Bulletin Board.

In its report, the SWMA Education Committee requested that safety information continue to be included, where appropriate, in NCWM training modules. The NCWM Education Committee agrees that such information is important and hopes to expand the discussion on safety in new modules and future module revisions. The SWMA also recommends that jurisdictions wishing to provide safety training for their personnel contact such organizations as the National Safety Council for material on such subjects as:

Defensive Driving; Supervisor Development; Fire Protection; Electrical Safety; and Handling Hazardous Substances.

A list of local chapters of the National Safety Council and a detailed list of materials available from the National Safety Council are provided in Appendix D of this report.

The letter from Jim Truex on behalf of the CWMA (see Appendix C) expressed that organization's concern about deviations from the policies and procedures of the National Training Program. These concerns are shared by the Education Committee. See Item 402-5 for the Committee's comments on this subject.

## 402 NATIONAL TRAINING PROGRAM (NTP)

### 402-1 I NTP STATUS REPORT

It was reported that the status of grant funds received from the National Bureau of Standards as of June 30, 1988, was as follows:

Net outlays to date:	\$422,323.39
Total unliquidated obligations:	15,000.00
(money committed to contractors)	
Total outlays & unliquidated obligations:	437,323.39
Total grant funds authorized:	515,189.00
Unobligated balance of funds:	77,865.61
(money available for future module development)	

The status of all training modules published or under development as of June 30, 1988, is given in Table C.

Table C  
TRAINING MODULE STATUS REPORT  
(As of 6/30/88)

<u>Module No.</u>	<u>Subject</u>	<u>Status</u>
1	Mechanical Computing Scales	Project completed.
2	Electronic Computing Scales	Project completed.
4	Medium-Capacity Scales	Project completed.
5	Vehicle and Axle-Load Scales	Project completed.
6	Monorail Scales	Project completed.
7	Livestock and Animal Scales	Project completed.
8	Retail Motor-Fuel Dispensers	Project completed.
10	Package Checking	Project completed.
13	Hopper Scales	Project temporarily halted.
19	Loading-Rack Meters	The working group is preparing a second draft.
20	Vehicle-Tank Meters	Project completed.
21	LPG Liquid Meters	Project completed.
22	Commodity Regulations	The module is being tested by the Ohio Office of Weights and Measures.
23	Weights and Measures Admin.	Project temporarily halted.
24	Introduction to Handbook 44	The contractor has completed the first draft of this module.
27	Electronic Weighing and Measuring Systems	Project completed.

#### 402-2 I CERTIFICATION PROGRAM IMPLEMENTATION

As of June 30, 1988, the following 40 jurisdictions had signed Letters of Agreement with the NCWM and had been accepted as participants in the NTP Certification Program:

Alabama	Kansas	Ohio
Alaska	Louisiana	Oklahoma
Arizona	Maine	Oregon
Arkansas	Massachusetts	Pennsylvania
California	Michigan	Puerto Rico
Connecticut	Minnesota	South Carolina
District of Columbia	Missouri	South Dakota
Florida	Montana	Utah
Georgia	Nebraska	Vermont
Hawaii	New Hampshire	Virginia
Idaho	New Mexico	Virgin Islands
Illinois	North Carolina	Washington
Indiana	North Dakota	Wisconsin
		Wyoming

Information summarizing participation in the NTP Certification Program is provided in Appendix A.

States participating in the Certification Program were sent annual report forms and asked to complete them for calendar year 1987. The Committee reviewed the responses received and noted the progress that was made. To assist jurisdictions that may still have some questions about the program, members of the Committee plan to make a presentation on the Certification Program and other aspects of the NTP at the next meeting of their respective regional associations. Up-to-date information on the NTP can be found in the revised NCWM Publication No. 11, National Training Program.

#### 402-3 I REGISTRY SUMMARY

A summary of information in the NTP Registry as of June 30, 1988, is found in Appendix B. The Registry serves as a permanent record of NCWM courses successfully completed and Continuing Education Units (CEUs) earned under the NTP.

#### 402-4 I MODULE REVISIONS

The Committee intends to provide for revision of the training modules on an annual basis. The Committee is currently working toward that objective. Work is underway on a revision of Module 2. Because extensive changes are being made to the module, change pages will not be issued; instead, the module will be republished in its entirety.

#### 402-5 I TRAINING PROGRAM IMPLEMENTATION

It has come to the Committee's attention that some jurisdictions do not follow NTP policies and procedures on module presentation and certification, but seek Continuing Education Units and NCWM certification for their officials. Reported deviations from NTP procedures include:

- presenting courses in substantially less time than that specified in the modules,
- combining two modules in one course (sometimes in the same amount of time or less time than required for one of the modules) and modifying module exams to cover the two modules; and
- failing to evaluate the performance of experienced officials in the field after module training and prior to recommending them for NCWM certification.

The Committee understands the goal of the National Training Program as providing uniform, professional training for weights and measures officials and a meaningful system of national recognition for those who successfully complete that training. The Committee is therefore very concerned about deviations of the type described above. If uniformity cannot be maintained, the integrity of the National Training Program will be questioned. (See Appendix C for a copy of Jim Truex's letter on deviations from the training program sent to the Committee on behalf of the Central Weights and Measures Association.)

The Committee questions the appropriateness of issuing Continuing Education Units to States that have not signed Letters of Agreement with the NCWM. The Committee will carry this item over until next year with the intention of submitting a voting item on this issue.

The Committee has also become aware of situations that hamper the learning process during module classes. These include:

##### Large Class Sizes

- Participants do not receive individual attention
- Instructors have difficulty supervising exams; reports of cheating have been received
- Class discussions are inhibited
- Time is wasted in lengthy administrative activities (e.g., taking attendance, distributing exams)
- Hands-on training activities are limited or left out

##### Classes Not Geared to Students Needs

- New inspectors are put into classes with experienced inspectors, resulting in an unsatisfactory situation for both groups
- New inspectors are not provided with adequate information on the content and format of Handbook 44 prior to being given module training; it is a prerequisite of all device modules that an individual be familiar with H-44 before taking module training.

The Committee feels that problems such as these might be avoided if jurisdictions had more information on how to conduct training programs and how to teach adults. The Committee has requested and the Executive Committee has approved a budget item of \$10,000 for development of Train-the-Trainer materials.



## 402-6 I TRAINING MODULE COMMENTS AND ISSUES

Several general issues raised by individuals who have taught or reviewed the training modules were discussed by the Committee. Background on the issues and the Committee's comments are given below.

## 1. Discrimination Tests

Background: The training modules and revised EPOs for scales now contain reference to paragraph N.1.5., Discrimination Test, in the Scales Code. This paragraph requires that "a discrimination test shall be conducted on all automatic indicating scales with the weighing device in equilibrium at zero-load and at maximum test load, and under controlled conditions in which environmental factors are reduced to the extent that they will not affect the results obtained." The requirement is nonretroactive as of January 1, 1986. The modules say that this test can be conducted in the field, but only if environmental factors can be controlled. We have received several comments to the effect that a discrimination test should be conducted only in the laboratory because environmental factors cannot be satisfactorily controlled in the field.

Comment: The Committee plans to inform the Committee on Specifications and Tolerances (S&T) that it has received several comments on this issue and ask S&T for guidelines on when and how this test may be conducted in the field.

## 2. Truncation of Tolerance Values

Background: The training modules for scales include procedures for truncating tolerance values to be applied to electronic scales in certain situations to allow for the direct reading of the scale during performance tests. For example, in the case of unmarked electronic scales, a tolerance equal to one-half the value of the scale division is added to the applicable tolerance; this sometimes results in fractional tolerance values. Because a digital scale cannot indicate a fraction of a scale division, the modules recommend adding the 1/2 d and, if the resulting value is not a whole number, dropping any fractional amount and using the remaining whole number as the tolerance for testing purposes. This practice has been questioned by several people.

Comment: The Committee believes that it is standard practice to truncate tolerance values to be applied to electronic scales in certain cases to allow for direct reading of the scale during performance tests in the field; however, this practice is not recognized in Handbook 44. The Committee recommends that the S&T Committee consider modifying the Handbook to reflect actual practice.

## 3. Use of Error Weights to Determine Tolerances Involving 1/2 d

Background: The scale modules include a procedure for using small weights (known as error weights) to determine if an electronic scale meets acceptance tolerances that include one-half of a scale division. Some people have confused this use of error weights with error testing (which involves the use of small weights to determine actual scale error). Others believe that the use of error weights is not necessary; that the scale should be considered in tolerance if it indicates the appropriate value or if the indication alternates between the appropriate weight value and the next higher or lower value (indicating that the scale is in the zone of uncertainty halfway between two values).

Comment: The Committee plans to ask the S&T Committee for guidance concerning this issue.

4. Repeatability

Background: The scales modules reference T.N.5., Repeatability, which states that the results obtained from several weighings of the same load under reasonably static test conditions shall agree within the absolute value of the maintenance tolerance for that load, and shall be within applicable tolerances. The modules and EPOs state that it is necessary to check repeatability frequently during a scale test. It has been suggested that this is not practical in the case of some of the larger scales where large test loads are used.

Comment: The Committee will carefully consider the wording of sections on repeatability in each of the scale modules as they are revised to ensure that they are appropriate.

5. Organization and Content of Instructor's Manual

Background: The two contractors who have assisted us in the development of training modules have taken different approaches to the organization and content of the Instructor's Manual for the modules. Some instructors have complained that the Instructor's Manuals prepared by Landvater Associates do not contain enough detail; the instructors have to keep going back and forth between the Inspector's and Instructor's Manuals. These instructors prefer the outline style used by Industrial Training Corporation.

Comment: The Committee has been working with its contractors to improve the usefulness of the Instructor's Manual. Emphasis will be placed on highlighting significant points from the Inspector's Manual in the Instructor's Manual and providing more information on how to develop detailed lesson plans.

6. Criteria for Passing Exams

Background: In the scales modules, course participants are required to get 100 percent correct on the tolerance work sheets in the final exam. On other parts of the exam, they are required to get only 80 percent of the questions correct. It has been suggested that the 100 percent requirement is too strict -- that an individual should be allowed to make a small error in addition or subtraction and still pass the exam. It has also been recommended that the 80 percent requirement apply to all questions in the exam rather than to each section separately. This would allow someone who had a little trouble with one section of the exam, but got all of the other questions correct, to pass.

Comment: The Committee is considering different approaches to scoring the tolerance work sheets. It also plans to change the 80 percent correct requirement to apply to all exam questions rather than to each section separately; this will be done as each module is revised.

Following the Interim Meeting, the Committee requested the Specifications and Tolerances (S&T) Committee's guidance with respect to discrimination tests, truncation of tolerance values, and use of error weights. The S&T Committee's reply is included in Appendix E of this report. The Education Committee will ask the NBS Office of Weights and Measures to add this information to NCWM Publication 3, Policy, Interpretations, and Guidelines.

#### 402-7 I FUTURE FUNDING

At the NCWM Interim Meeting in January 1988, Dr. Ernest Ambler, Director of the National Bureau of Standards, invited the Education Committee to submit a proposal and request for a funded extension of the current grant from NBS to the NCWM for the purpose of developing additional training materials for weights and measures officials. The Committee requested a 3-year extension and funds totaling \$180,000 (\$60,000 a year). In July 1988, NBS notified the Conference that it had approved the allocation of \$60,000 for the development of two training modules in FY 1988. The Committee wishes to express its appreciation to NBS for its ongoing support of the National Training Program.

#### 402-8 I OWM'S TRAINING

The Committee reviewed a memorandum from the NBS Office of Weights and Measures (OWM) to State Weights and Measures Directors on OWM'S 1988 Training Program (see Appendix F). In the memorandum, OWM states that it plans to continue to provide training based on the NCWM training modules, concentrating on two types of modules: (a) those modules that are absolutely essential for understanding by most weights and measures officials (such as the modules on electronic computing scales and motor-fuel dispensers) and (b) those modules in specialty areas (such as the LPG module) that might be difficult for some states to present on their own. In the case of the essential modules, OWM sees its role as preparing potential state trainers to teach the modules. In the case of the specialty modules, OWM plans to teach the individuals who will actually be doing the activity covered by the module.

The Committee encourages the Education Committees of the regional weights and measures associations to become involved in coordinating the training activities of their member States with training activities of OWM.

#### 402-9 I REVIEW OF COMMODITY REGULATIONS MODULE

The first contractor's draft of this module was reviewed. The Committee's suggestions and corrections were sent to the contractor for incorporation in the field test draft of the module.

#### **402-10 I REVIEW OF PRODUCTION SCHEDULE/PLANNING**

The Committee considered two proposals from different groups for developing a new training module on an introduction to NBS Handbook 44. One of the proposals was selected. Work on the new module began in March 1988; the completion date is tentatively scheduled for December 1988. The module will include information on the history of the Handbook, its organization and format, how to use it, and the basic principles underlying the Handbook.

T. Geiler, Town of Barnstable, MA, Chairman

W. Diggs, Virginia (replaced T. Scott, North Carolina)

M. Gray, Florida

C. Greene, New Mexico

S. Malone, Nebraska

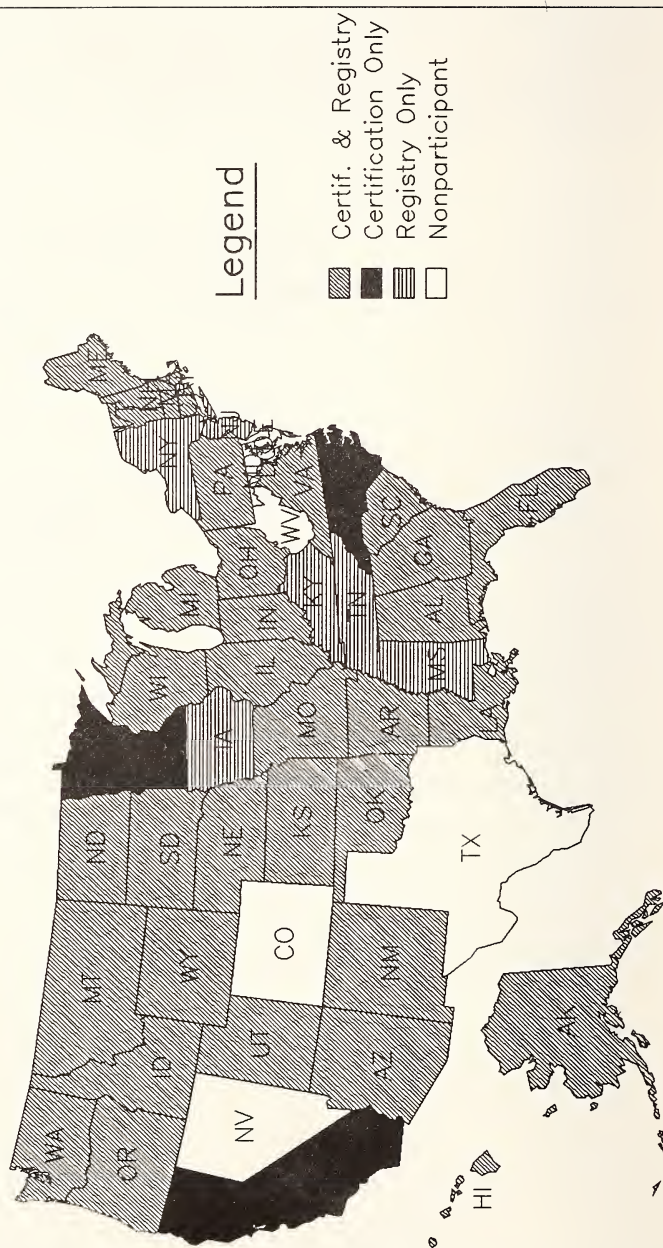
J. Koenig, NBS, Technical Advisor

#### **COMMITTEE ON EDUCATION, ADMINISTRATION, AND CONSUMER AFFAIRS**

## APPENDIX A



## STATES PARTICIPATING IN THE NATIONAL TRAINING PROGRAM



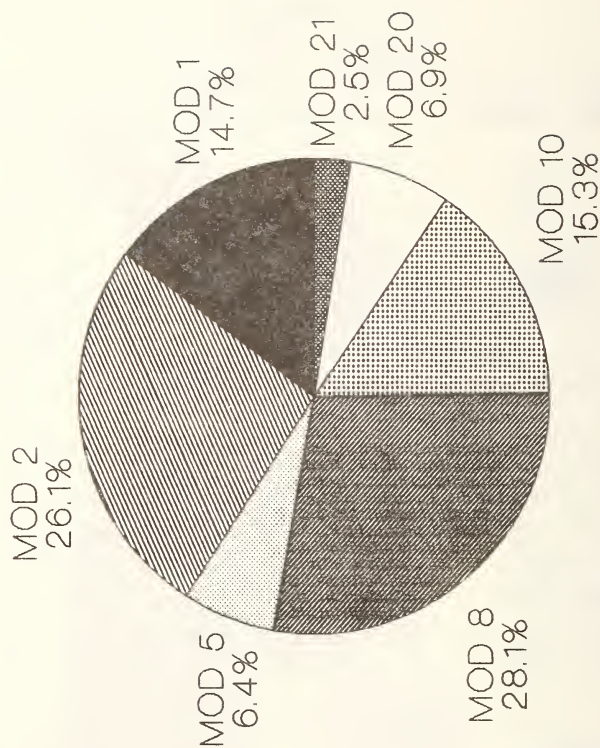
# Certification Summary

As of 6/30/88

State	Total No. of Certif.	Total No. of People	Modules						
			1	2	5	8	10	20	21
AK	10	10				10			
AZ	28	28		28					
AR	90	31	20	20	8	30	12		
CT	37	19		15	2		15	3	2
DC	3	3				3			
FL	16	12	6	3			7		
ID	9	9				9			
KS	18	9	7	7	4				
LA	1	1					1		
MI	30	14			9			14	7
MO	2	2					2		
NE	2	2		2					
NH	25	8	6	5		6		8	
ND	3	3				3			
OH	7	7				7			
OR	16	11				10	6		
SD	7	7				7			
UT	40	16	14	14			12		
WA	16	16				16			
<u>19</u>	<u>360</u>	<u>208</u>	<u>53</u>	<u>94</u>	<u>23</u>	<u>101</u>	<u>55</u>	<u>25</u>	<u>9</u>

# Certification Summary

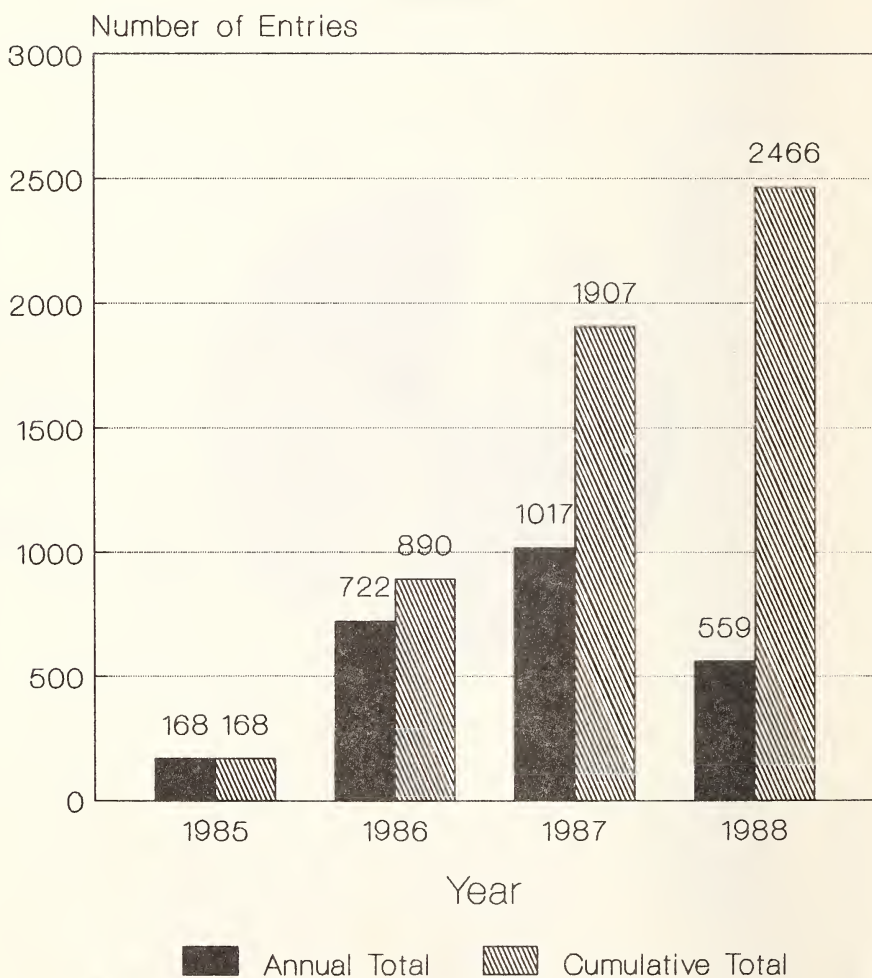
## (By Module)



APPENDIX B

# Growth of NTP Registry

## (Annual and Cumulative Data)



1988 data as of 6/30/88



## APPENDIX B

### National Training Program Registry Summary of Activity (As of June 30, 1988)

#### Courses Listed:

Module 1, Retail Computing Scales - Mechanical  
 Module 2, Retail Computing Scales - Electronic  
 Module 4, Medium-Capacity Scales  
 Module 5, Vehicle and Axle-Load Scales  
 Module 6, Meat Beams and Monorail Scales  
 Module 7, Livestock and Animal Scales  
 Module 8, Retail Motor-Fuel Dispensers and Consoles  
 Module 10, Checking the Net Contents of Packaged Goods  
 Module 20, Vehicle-Tank Meters  
 Module 21, LPG Liquid-Measuring Devices  
 Module 27, Introduction to Electronic Weighing and Measuring Systems  
 OWM 0201, Basic Metrology I  
 OWM 0202, Basic Metrology II  
 OWM 0203, Intermediate Metrology

#### No. of Individuals Trained:

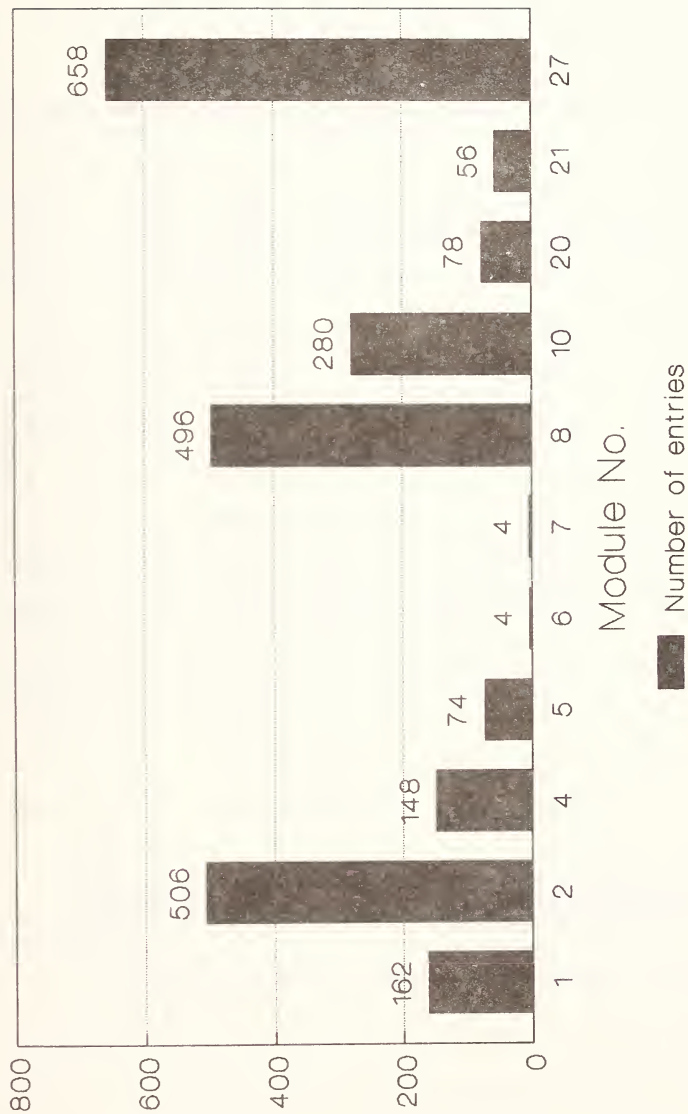
State	Module											Totals
	<u>1</u>	<u>2</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>10</u>	<u>20</u>	<u>21</u>	<u>27</u>	
AK							10	8				18
AL		15	12				14				25	66
AR	20	20		8			30	12				90
AZ		27								25		52
CT		21		2			16	18	6	2		65
DC	4	4					3					11
FL	13	21	2	4			24	19	8		41	132
GA			11								7	18
HI								14			4	18
ID		9					10				8	27
IL			1				7					8
IN		43	46				56				48	193
IA							4					4
KS	9	10	14	5			3	8	2		8	59
KY			1				19					20
LA								1				1
MA		15	3	5			14	3	31	1	12	84
ME			2	1			8			2	4	17

APPENDIX B (Continued)

No. of Individuals Trained (Continued):

<u>State</u>	<u>1</u>	<u>2</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>10</u>	<u>20</u>	<u>21</u>	<u>27</u>	<u>Totals</u>
MI		45		13			2	29	22	12	53	176
MS			2									2
MO			13				28	2			22	65
MT			5				6				8	19
NE		3	4				13	10			1	31
NH	6	5	7				6		8		6	38
NJ											121	121
NM		11					8	13		2		34
ND			3				3				12	18
NY		74						8		9		91
OH				13	4	4	42	8			58	129
OK			2					19			2	23
OR		17					12	16			16	61
P&S											3	3
PA	34	65					56	32		1	82	270
RI		1		1					1			3
SC		25					28					53
SD			7				7	9			10	33
TN											5	5
UT	15	14						12		1	15	57
VA				9				38				47
VT	5		3				7	1			5	21
WA		8					16			1	16	41
WI	56	53		13			28				63	213
WY			10				16				3	29
<u>Totals</u>	<u>162</u>	<u>506</u>	<u>148</u>	<u>74</u>	<u>4</u>	<u>4</u>	<u>496</u>	<u>280</u>	<u>78</u>	<u>56</u>	<u>658</u>	<u>2466</u>

# No. of Entries in NTP Registry For Each Module



Data as of 6/30/88

Continuing Education Units (CEUs) Awarded  
By the National Conference on Weights and Measures  
(As of 6/30/88)

<u>Mod</u>	<u>CEUs*</u>	<u>No. of Partic.</u>	<u>1985 Total</u>	<u>1986 Total</u>	<u>1987 Total</u>	<u>1988 Total</u>	<u>Grand Totals</u>
1	3.1	162	-	306.9	77.5	117.8	502.2
2	3.1**	506	-	65.1	857.9	564.2	1487.2
4	3.1	148	-	-	-	458.8	458.8
5	3.1	74	-	-	96.1	133.3	229.4
6	3.1	4	-	-	12.4	-	12.4
7	3.1	4	-	-	12.4	-	12.4
8	2.8	496	-	288.4	856.8	243.6	1388.8
10	2.8	280	75.6	372.4	302.4	33.6	784.0
20	2.8	78	-	-	156.8	61.6	218.4
21	3.5	56	-	-	105.0	91.0	196.0
27	1.1	658	155.1	402.6	165.0	1.1	723.8
Totals		2466	230.7	1435.4	2642.3	1705.0	6013.4

\*One CEU is equivalent to 10 contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction.

\*\*One Module 2 class with 74 participants was given only 2.0 CEU's.



Appendix C

CENTRAL  
WEIGHTS & MEASURES  
ASSOCIATION



December 8, 1987

Joan A. Koenig  
Office of Weights & Measures  
National Bureau of Standards  
Administration A617  
Gaithersburg, Maryland 20899

Dear Ms. Koenig:

The interim meeting of the Central Weights and Measures Association (CWMA) was held in Jefferson City, Missouri, October 20, 21 & 22. One topic during the business session was the National Training Program (NTP). On behalf of the CWMA, this letter will address some of our concerns.

Recent training schools conducted in some states were brought to the attention of our group. In some cases, these training schools involved large classes of 40 inspectors, 70 inspectors, or even more. Often modules were combined. In one reported case, four modules were presented in a five day period. According to the instructors' manuals, the recommended time that should have been devoted to the four modules was 121 hours. It is also our understanding that instructors may have severely deviated from the instructors' manuals and that the final exams were altered.

The CWMA is on record as supporting the NTP. Nonetheless, if the alleged type of training alluded to above is recognized, and CEU's are given, the consensus of our group is that the integrity of the NTP is at stake. The CWMA would ask that the National Conference on Weights and Measures and the Conference's Education Committee take a close look at the type of training being administered.

If the Education Committee sees the need, other members of the CWMA along with myself would welcome the opportunity to discuss our concerns in front of the committee at the interim meetings in January. Please don't hesitate to contact me if you have any questions.

Sincerely,

*James C. Truex*

James C. Truex  
Chairman, CWMA

JCT:d11  
cc: Al Tholen, Executive Secretary, NCWM  
All CWMA State Directors





## APPENDIX D

# LOCAL SAFETY COUNCILS

You can order the materials in this catalog from the Council's network of chapters listed here. Every time you place an order through your local chapter, you help support safety and health activities in your area. Local chapters can also provide you with expert assistance for all your safety and health needs.

**Alabama**  
North Alabama Chapter  
207 1st Avenue, North  
Birmingham, AL 35203  
(205) 328-7233  
**South Alabama Chapter**  
P.O. Box 5217  
Mobile, AL 36605  
(205) 433-3943  
**Arizona**  
**Arizona Chapter**  
1515 East Osborn Road  
Phoenix, AZ 85014  
(602) 264-2394  
**California**  
**Safety Council of San Francisco-San Mateo Counties**  
1111 Trion Drive  
Foster City, CA 94404  
(415) 341-3649  
**Greater Los Angeles Chapter**  
616 South Westmoreland  
Avenue  
Los Angeles, CA 90005  
(213) 833-6461  
**Sacramento Safety Council**  
3909 Bradshaw Road  
Sacramento, CA 95827  
(916) 366-7233  
**San Diego County Safety Council**  
3320 Kemper Street  
San Diego, CA 92110  
(619) 223-2637  
**Colorado**  
**Colorado Safety Association**  
555 17th Street  
Denver, CO 80202  
(303) 297-2111  
**Connecticut**  
**Connecticut Safety Council**  
370 Asylum Street  
Hartford, CT 06103  
(203) 547-1661  
**Delaware**  
**Delaware Safety Council, Inc.**  
3836 Kennett Pike  
Wilmington, DE 19807  
(202) 654-7786  
**Florida**  
**Pinellas County Chapter**  
2385 Sunset Point Road  
Clearwater, FL 33575  
(813) 799-0233  
**Volusia-Flagler Safety Council**  
65 Coral Sea Avenue  
Daytona Beach, FL 32014  
(904) 253-6400  
**Broward Chapter**  
2750 West Oakland Park  
Boulevard  
Fort Lauderdale, FL 33311  
(305) 483-8033  
**Southwest Florida Safety Council, Inc.**  
P.O. Box 2057  
Fort Myers, FL 33902  
(813) 332-3068  
**Florida Treasure Coast Safety Council**  
205 Orange Avenue  
Ft. Pierce, FL 33450  
(305) 461-1424  
**North Central Florida Safety Council**  
1330 N.W. 13th Street  
Gainesville, FL 32601  
(904) 377-2366

**Maryland**  
**Safety Council of Maryland**  
17 Governor's Court  
Baltimore, MD 21207  
(301) 298-4770  
**Massachusetts**  
**Massachusetts Safety Council, Inc. (Serving Eastern Massachusetts)**  
111 Beach Street  
Boston, MA 02111-2511  
(617) 542-6067  
**Safety Council of Western Massachusetts**  
90 Berkshire Avenue  
Springfield, MA 01109  
(413) 737-1479  
**Central Massachusetts Chapter**  
25 Quinsigamond Avenue  
Worcester, MA 01608  
(617) 791-9366  
**Michigan**  
**Safety Council for Southwest Michigan**  
437 West Cross-town  
Parkway  
Kalamazoo, MI 49001  
(616) 344-6189  
**Lansing Area Safety Council**  
P.O. Box 14236  
Lansing, MI 48901-4236  
(517) 482-1583  
**Safety Council for Southeast Michigan**  
16250 Northland Drive  
Southfield, MI 48075  
(313) 557-7010  
**Minnesota**  
**Minnesota Safety Council**  
474 Concordia Avenue  
St. Paul, MN 55103  
(612) 291-9150  
**Missouri**  
**Missouri Safety Council**  
611 East Capitol Avenue  
Jefferson City, MO 65101  
(314) 636-8167  
**Safety Council of the Ozarks**  
300 South Jefferson  
Springfield, MO 65806  
(417) 869-2121  
**Safety and Health Council of Western Missouri and Kansas**  
714 East 12th Street  
Kansas City, MO 64106  
(816) 842-5223  
**St. Joseph Safety Council**  
401 North 12th Street  
St. Joseph, MO 64501  
(816) 233-3330  
**Safety Council of Greater St. Louis**  
1015 Locust Street  
St. Louis, MO 63101  
(314) 621-9200  
**Nebraska**  
**Safety Council of Nebraska**  
P.O. Box 30578  
Lincoln, NE 68503  
(402) 483-2511  
**Safety and Health Council of Greater Omaha, Inc.**  
2513 St. Mary's Avenue  
Omaha, NE 68105  
(402) 343-1067  
**New Hampshire**  
**New Hampshire Safety Council, Inc.**  
P.O. Box 1382  
Concord, NH 03301  
(603) 228-1401  
**New Jersey**  
**New Jersey State Safety Council**  
6 Commerce Drive  
Cranford, NJ 07016  
(201) 272-7712  
**New York**  
**Northeastern New York Safety and Health Council**  
845 Central Avenue

Albany, NY 12206  
(518) 438-2365  
**Rochester Safety Council**  
55 St. Paul Street  
Rochester, NY 14604  
(716) 454-2920  
**North Carolina**  
**Citizens Safety Association of Charlotte-Mecklenburg, Inc.**  
300 East Morehead Street  
Charlotte, NC 28202  
(704) 334-7242  
**North Dakota**  
**North Dakota Safety Council**  
2400 Railroad Avenue  
Bismark, ND 58501  
(701) 232-6372  
**Ohio**  
**Greater Cleveland Safety Council**  
1375 Euclid Avenue  
Cleveland, OH 44115  
(216) 621-0059  
**Safety Council of the Columbus Area**  
P.O. Box 1527  
Columbus, OH 43216  
(614) 225-6933  
**Dayton-Miami Valley Safety Council**  
40 North Main Street  
Dayton, OH 45423-1980  
(513) 226-1444  
**Greater Hamilton Safety Council**  
840 High Street  
Hamilton, OH 45011  
(513) 896-3333  
**Safety Council of the Middletown Area**  
29 City Centre Plaza  
Middletown, OH 45042  
(513) 423-9758  
**Toledo-Lucas County Safety Council**  
One Stranahan Square  
Toledo, OH 43604  
(419) 255-0510  
**Safety Council of Northeastern Ohio**  
25 East Boardman Street  
Youngstown, OH 44503  
(216) 747-8657  
**Oklahoma**  
**Oklahoma Safety Council**  
P.O. Box 14686  
Oklahoma City, OK 73113  
(405) 848-8626  
Eastern Division Office  
9820 East 41st Street  
Tulsa, OK 74146  
(918) 665-8272  
**Pennsylvania**  
**Lehigh Valley Chapter**  
53 East Lehigh Street  
Bethlehem, PA 18018-6006  
(215) 866-6871  
**Western Pennsylvania Safety Council**  
2550 Mosside Boulevard  
Monroeville, PA 15146-3540  
(412) 856-5400  
**South Carolina**  
**Palmetto Safety Council**  
P.O. Box 31013  
Charleston, SC 29417  
(803) 766-8326  
Division Office  
P.O. Box 6664  
Columbia, SC 29260  
(803) 782-5030  
**South Dakota**  
**South Dakota Safety Council**  
2021 East 10th Street  
Sioux Falls, SD 57103  
(605) 338-4712  
West River Division  
115 St. Joseph Street  
Rapid City, SD 57701  
(605) 341-3670

**Tennessee**  
**Chattanooga Area Safety Council**  
1001 Market Street  
Chattanooga, TN 37402  
(615) 736-1731  
**Texas**  
**Texas Safety Association, Inc.**  
P.O. Box 9345  
Austin, TX 78766  
(512) 343-6525  
Division Offices  
Safety Council of Greater Dallas  
3300 West Mockingbird Lane  
Dallas, TX 75235  
(214) 351-3236  
Safety Council of Greater Houston  
2990 Richmond Avenue  
Houston, TX 77098-3109  
(713) 523-2928  
**Safety Council of Fort Worth & Tarrant County, Inc.**  
301 Oakhurst Scenic Drive  
Fort Worth, TX 76111  
(817) 831-0641  
**Greater San Antonio Safety Council**  
1550 N.E. Loop 410  
San Antonio, TX 78209  
(512) 824-8180  
**Utah**  
**Utah Safety Council**  
353 South 300 West  
Salt Lake City, UT 84101  
(801) 533-5851  
**Virginia**  
**Virginia Safety Association**  
31084 West Leigh Street  
Richmond, VA 23230  
(804) 353-2208  
**Washington**  
**Evergreen Safety Council**  
7600 Sand Point Way, N.E.,  
Bldg. 32  
Bin C-15700  
Seattle, WA 98115-0070  
(206) 326-1670  
**West Virginia**  
**West Virginia Safety Council**  
1550 Fourth Avenue  
Charleston, WV 25312  
(304) 343-3171  
**Wisconsin**  
**Milwaukee Safety Commission**  
841 North Broadway  
Milwaukee, WI 53202  
(414) 278-3571  
**Wisconsin Council of Safety**  
P.O. Box 352  
Madison, WI 53701-0352  
(608) 238-3400  
**Wyoming**  
**Wyoming Safety Council**  
1603 Central Avenue  
Cheyenne, WY 82001  
(307) 635-4592

**Canada**  
**British Columbia Safety Council**  
4161 McConnell Drive  
Burnaby, British Columbia  
CANADA, V5A 3J7  
(604) 420-4110  
**Quebec Safety League**  
6785 St. Jacques Street,  
West  
Montreal, Quebec  
CANADA H4B 1V3  
(514) 482-9110  
**Saskatchewan Safety Council**  
348 Victoria Avenue  
Regina, Saskatchewan  
CANADA S4N 0P6  
(306) 737-3197

Excerpt from the 1988 General Materials Catalog of the National Safety Council.

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## APPENDIX E





## NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

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June 9, 1988

Mr. Thomas F. Geiler  
Chairman, Committee on Education,  
Administration, and Consumer Affairs  
National Conference on Weights and Measures  
P.O. Box 3137  
Gaithersburg, Maryland 20878

Dear Mr. Geiler:

This letter represents the Committee on Specifications and Tolerances' response to your letter of February 24, 1988. The issues addressed in your letter included the discrimination test, the truncation of tolerance values, and the use of error weights to determine scale accuracy. These tests and procedures are found in a number of the training modules and are required by provisions found in National Bureau of Standards Handbook 44.

### 1. Discrimination Tests

The Committee's position is that the training module is correct in stating that a discrimination test should be performed on scales if environmental factors are reduced to the extent that they will not affect the results obtained. First, we must state that the ability of a scale to comply with the discrimination requirement of the handbook is a primary factor in accepting the device for commercial use. On an electronic scale, the instrument must be capable, under normal environmental conditions of use, to provide a stable indication of weight when the electronic signal is above or below the zone of uncertainty. If the signal is above the zone, the higher value must be displayed. If the signal is below the zone, the lower value must be displayed. If the signal is in between these two breakpoints, the device may indicate the upper or lower value or may flicker between the two values. It is obvious, then, that since many tolerance values are based on half-divisions, the limitation on digital uncertainty at the "breakpoint" must be insured. Simply, performance of the device during everyday use will be unacceptable if the zone of uncertainty is greater than 0.3 division. For mechanical analog devices, the discrimination test is just as vital in determining a device's acceptability for everyday use as is the sensitivity test for

mechanical beam scales. If a dial scale does not respond to the 1.4 division test load, it will not provide repeatable weighings within tolerance values.

The claim that this test is a "laboratory" procedure must give way to the practical explanations which counter the arguments. Certainly, the foundation of these explanations must begin with the simple fact that scales must perform within tolerance in everyday environments and not only in laboratory conditions. Secondly, there is a general misunderstanding of the term "laboratory environment." This adds to the confusion surrounding the appropriateness of the discrimination test.

The misunderstanding is caused primarily by a misinterpretation of NBS Handbook 44. The phrase in N.1.5. which reads "controlled conditions in which environmental factors are reduced to the extent that they will not affect the results obtained" has been misdefined as meaning "a laboratory environment." This is simply not what the handbook says or means.

The specifications and tolerances of NBS Handbook 44 are directed to the everyday environments in which scales are used. If a device is "suitable for the environment in which it is used," as required in G-UR.1.2. Environment, the device should be tested for discrimination under normal conditions.

"Normal conditions" are those typical to the environment. If a retail price computing scale (mechanical or electronic) is used at a checkout counter or at an outdoor market, it should be tested as specified in N.1.5. The same rule applies to livestock, motor truck, or hopper scales. In every case, the inspector should determine if the scale is suitable for the environment and if the conditions are conducive to performing the required inspections. If the scale is fluctuating several divisions due to wind, electric power changes, or RFI, a decision must be made relative to the device's suitability under G-UR.1.2. Environment, as well as the appropriateness of performing the discrimination test or taking any other official action.

The procedures for performing the discrimination test specified in the Notes Section of Handbook 44 and in the NCWM Training Modules are appropriate as currently written. What the field inspector needs is a better understanding of the purpose for a discrimination test. It should be seen in the same terms as a sensitivity test for beam scales and not as a "laboratory" procedure suitable only for devices tested under controlled temperatures, air flows, and pressures. On electronic scales, the discrimination test ensures that the "stabilizing" circuitry or software effects are kept to

reasonably small values. It will also reveal mechanical problems and improper repairs on a device. On mechanical scales, the response of the components to light loads and the effects of friction are examined. If the field official is to ensure that a new device or the same device is repaired properly five years from now is acceptable, the discrimination test must be a routine step in the examination procedure.

One consideration not addressed by the training modules is the need for suitable test weights. The discrimination test requires that the inspector have test weights of Class F or better in accuracy and in denominations equal to 0.1 division. This may limit most officials to testing devices for compliance with the discrimination test to scales having a scale division greater than 0.01 lb or more. To assist the Education Committee in its efforts, three illustrated examples of the discrimination test have been developed and are enclosed for the Committee's review. Finally, no restriction should ever be placed in NBS Handbook 44 that would prevent an official from performing a test to determine compliance with legal requirements in the field.

## 2. The Use of Error Weights to Determine Tolerances Involving One-Half Division

There appears to be some confusion between the several methods used to determine the accuracy of a weighing device. There are three methods available to the field official, each having advantages and disadvantages. First, we would like to describe the three methods.

### (a) Error Determination

This method involves the use of test weights normally equal to fractions of a division to determine the exact error of the device. This procedure is commonly used in the testing of livestock scales under the USDA Packers and Stockyards Scale Testing Program. The inspector will add or remove weights and determine the exact sensitivity of a mechanical scale or the error in a mechanical or electronic scale using the decimal weights. The error is determined to the value of the smallest unit of weight (e.g., 1/10 of a scale division) and recorded. This procedure is also used in type evaluation under NTEP and by scale repair technicians. It is the most accurate method of the three to record scale errors. It is akin to reading a 5-gallon test measure to 1 cubic inch when the tolerance to be applied to the gas pump is 6 cubic inches. The main disadvantage of this

method is that it is time consuming. Since most official actions are based on a pass/fail decision where the official does not need to know the exact error in the device, this method is not required in most situations.

(b) Tolerance Testing Using Error Weights

This method utilizes the addition or removal of weight equal to the tolerance limit to determine if the scale indication exceeds the allowable tolerance. The precise error, either inside or outside the tolerance limit, is not determined. This is simply a pass/fail test. In the case of a mechanical scale with either a beam or dial indicator, simply adding or removing weight equal to the tolerance is all that is needed to see if the change of weight brings the indication back to the balance condition (or desired indication for dials) or beyond. The use of tip weight kits to add or remove weight from the counterpoise weight hanger on beam scales is another excellent technique. In the case of digital-indicating scales, some additional considerations apply.

To properly apply the tolerance to a digital scale, Handbook 44 permits one-half of a scale division to be added to the tolerance that would normally apply to a scale without an accuracy class marking if the inspector is direct reading the scale errors. Digital scales that are marked with an accuracy class do not get an extra one-half scale division tolerance. The extra one-half scale division is not given to unmarked scales if error weights are used to determine the actual scale error. For unmarked digital scales (those not marked with an accuracy class), it is usually easier to use direct reading to determine if the scale indication is in or out of tolerance. Direct reading is discussed below in (c).

The pass/fail tolerance test for scales marked with an accuracy class is simplified because the scale tolerances are expressed in either whole scale divisions or involve one-half of a scale division. This has the advantage of requiring the use of only one size of error weight, that is, an error weight equal to one-half scale division. If the scale tolerance for an applied test load ends in one-half of a scale division, no error weight is needed because digital indications for most scales round to the nearest scale division as required by Handbook 44. For example, if the tolerance is 1.5d, the scale indication would be within tolerance if the indicated error was 0, -1d, or



+1d. If the scale error was -2d or +2d, then the scale would be out of tolerance because the indications of -2d and +2d represent weight values of -2.5d to -1.5d and 1.5d to 2.5d, respectively. We recommend that a scale indication at the zone of uncertainty between -1d and -2d or of 1d and 2d be considered within tolerance. This recognizes that -1.5d and 1.5d may be in the zone of uncertainty and gives the benefit of a slightly larger tolerance to the scale without requiring the use of additional error weights.

If the scale tolerance for marked scales is in whole scale divisions, e.g.,  $\pm 1.0d$ ,  $\pm 2.0d$ , etc., then an error weight equal to one-half scale division is needed whenever the indicated error is equal to the tolerance limit. If the indicated error is equal to the plus tolerance limit, the error weight should be removed. After the error weight is removed, if the scale indicates a smaller scale error or is at the zone of uncertainty of the tolerance limit and a lower indication, the scale is considered to be within tolerance. If the indicated error is at the minus tolerance limit, the error weight should be added. After the error weight is added, if the scale indicates a smaller scale error or is at the zone of uncertainty of the tolerance limit and a higher indication, the scale is considered to be within tolerance.

The main difference between this method and the error determination method lies primarily in how precisely the readings are made. This method is the best for use in testing commercial devices.

#### (c) Direct Reading

This method is the least accurate of the three methods and relies on the judgement of the inspector and the indications of the device. On a mechanical scale the beam settles above or below the center of the trig loop and the inspector estimates the error of the scale. This method of determining the scale error is discouraged. On a dial scale the indicator comes to rest between graduations and the inspector estimates the error based on the position of the indicator relative to the graduations. This is more precise than estimating the error on a beam scale, however, the use of error weights as explained in (b) is preferred. On a digital scale the displayed indication is accepted as being exact without recognizing that the error can be anywhere within plus or minus one-half scale division, e.g. 0.055 lb and 0.065 lb can be indicated as 0.06 lb on a scale indicating



to 0.01 lb.

### 3. The Truncation of Tolerance Values

The Specifications and Tolerances Committee intends that the truncation of tolerance values be used as the appropriate method to apply the tolerance when direct reading digital indicating scales. The additional one-half scale division tolerance was added to Handbook 44 to facilitate the testing of unmarked digital scales without substantially increasing the tolerance applied to the scale. This is achieved in the following manner.

Suppose that an unmarked scale with a capacity of  $1000 \times 0.2$  lb is being tested to maintenance tolerances. The tolerance is effectively 0.1 percent of the applied test load. For a load of 350 lb, the tolerance is 0.35 lb or 1.75d and would fall in the first one-half of the displayed scale division of 350.4 lb. If the scale indicated an error of 2d for a test load of 350 lb, the scale indication could be within tolerance. To determine whether or not the scale is actually within tolerance would require the use of error weights. However, to simplify the tolerance test of a scale, the Handbook permits the addition of one-half scale division to the tolerance specified by Handbook 44 to permit direct reading of the error. In the example where the Handbook tolerance is 1.75d; adding 0.5d makes the tolerance 2.35d. By dropping the fraction of a division (since the digital scale can only indicate in whole scale divisions), the direct reading tolerance is 2d. Consequently, if the scale indicates an error of 2d, the scale may be considered to be within tolerance.

Suppose that the tolerance for a particular test load as computed from Handbook 44 is in the upper one-half of the displayed scale division, say 2.3d. The addition of one-half scale division would allow a tolerance of 2.8d. Dropping the fraction of a scale division (since the digital scale can only indicate in whole scale divisions), the direct reading tolerance is 2d. People have questioned whether or not the tolerance of 2.8d should be rounded to 3d for direct reading. This is not appropriate because it would substantially increase the allowed tolerance beyond what is specified in Handbook 44. Because digital indications are required to be rounded to the nearest scale division (General Code G-S.5.2.2.), a scale indication of 2d represents a range of weight values from 1.5d to 2.5d. Consequently, in the example where the tolerance was computed to be 2.3d before adding the one-half scale division, dropping the fraction of a scale division for the purposes of directing reading still gives the scale a tolerance of up to 2.5d, which is larger than the tolerance that would be applied if

the error was determined using error weights. If it were permissible to round the 2.8d to 3d, the scale would be permitted to have an error up to 3.5d which would be grossly in excess of the intended tolerance. By dropping the fraction of a scale division, the applied tolerance for direct reading is reasonably consistent with the tolerance specified in Handbook 44.

The Committee on Specifications and Tolerances continues to support the use of either the Error-Determination or Tolerance Testing Using Error Weights Methods for inclusion in NCWM training modules. We recommend that the Tolerance Testing Using Error Weights Method be used when tolerances are in whole divisions, since marked digital scales are not given an extra one-half scale division tolerance. This eliminates the potential one-half division error possible with the direct reading method on digital scales and the "judgment" used with analog devices.

We believe that this letter provides a complete response to your request for a Committee position on these matters. If we can provide further information or support, please contact us.

Sincerely,

A handwritten signature in cursive script that reads "Kenneth S. Butcher".

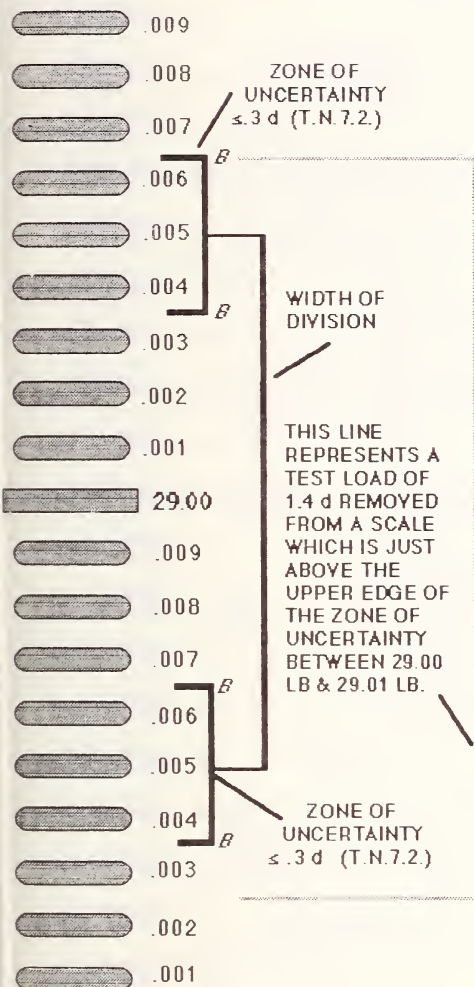
Kenneth S. Butcher, Chairman  
Committee on Specifications  
and Tolerances

cc: H. Oppermann, NBS

## 2901

THIS EXAMPLE IS  
BASED ON A SCALE  
DIVISION OF .01 LB AT  
A TEST LOAD OF  
29.00 LB

1. WITH THE SCALE AT ZERO ADD DECIMAL WEIGHTS EQUAL TO 1.4 d
2. AND ZERO THE DEVICE. ADD TEST WEIGHTS TO MAKE THE SCALE INDICATE A WEIGHT VALUE NEAR CAPACITY ( eg. 29.00 lb.).
3. WITH THE SCALE STABLE ADD DECIMAL WEIGHTS IN .1d INCREMENTS UNTIL THE INDICATION FLICKERS BETWEEN 29.00 LB & 29.01 LB. CONTINUE ADDING WEIGHTS IN .1d INCREMENTS UNTIL THE INDICATION SHOWS A STEADY 29.01 LB. THE SCALE IS NOW JUST ABOVE THE UPPER EDGE OF THE ZONE OF UNCERTAINTY.
4. REMOVE THE 1.4 d TEST LOAD. ( .014 LB )
5. THE SCALE SHOULD INDICATE A STEADY 28.99 LB.
6. IF THE SCALE PASSES NEAR THE MAXIMUM CAPACITY, THE TEST SHOULD BE PERFORMED NEAR ZERO.



THE PRINCIPLES USED IN THIS  
EXAMPLE CAN ALSO BE USED TO  
TEST SCALES WITH MINIMUM  
DIVISIONS GREATER THAN .01 LB.

*B* = BREAKPOINT

 .06


# DISCRIMINATION TEST INCREASING LOAD

PART A JUNE 8, 1933

 .009

 .008

 .007

 .006  $B$  ZONE OF  
UNCERTAINTY  
 $\leq 3 d$  (T.N.7.2.)

 .005

 .004

 .003  $B$  WIDTH OF  
DIVISION

 .002


 .001

 .05

 .009

 .008

 .007

 .006  $B$  THIS LINE  
REPRESENTS A  
TEST LOAD OF  
1.4  $d$  APPLIED  
TO A SCALE  
WHICH IS JUST  
BELOW THE  
LOWER EDGE  
OF THE ZONE OF  
UNCERTAINTY  
BETWEEN  
.04 & .05

 .005

 .004  $B$

 .003

 .002 ZONE OF  
UNCERTAINTY  
 $\leq 3 d$  (T.N.7.2.)

 .001

 .04

$B = \text{BREAK POINT}$

THIS EXAMPLE IS  
BASED ON A SCALE  
DIVISION OF .01 LB.

## TEST PROCEDURE

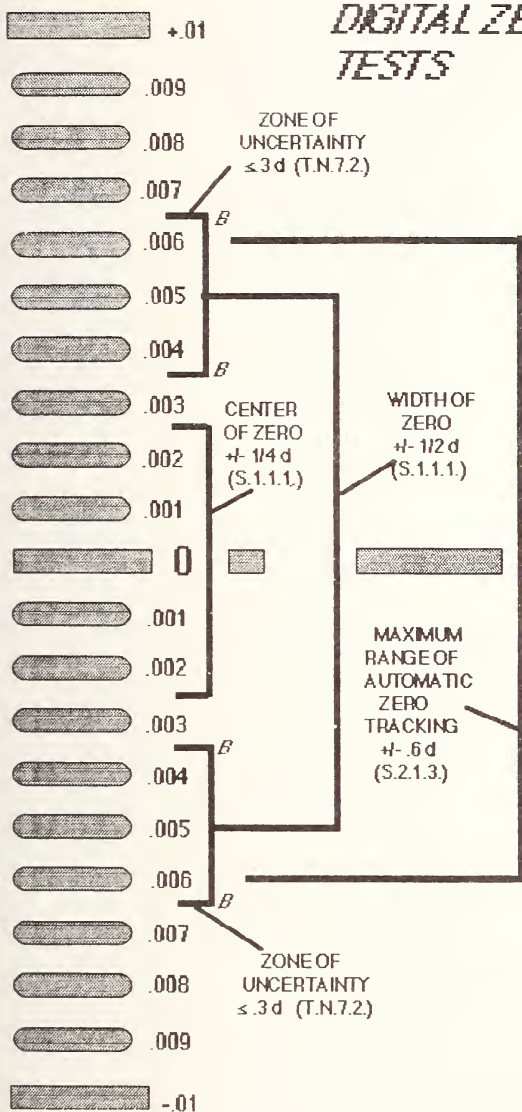
1. WITH THE DEVICE AT ZERO  
PLACE DECIMAL WEIGHTS  
ON SCALE EQUAL TO 1  $d$ .
2. ZERO THE SCALE AND  
PLACE A TEST LOAD EQUAL  
TO .05 LB. ON THE LOAD  
RECEIVER.
3. REMOVE THE DECIMAL  
WEIGHTS IN .1  $d$   
INCREMENTS UNTIL THE  
INDICATION FLICKERS  
BETWEEN .04 & .05 LB.  
CONTINUE REMOVING  
WEIGHTS IN .1  $d$   
INCREMENTS UNTIL THE  
INDICATION SHOWS A  
STEADY .04 LB.  
THE SCALE IS NOW  
JUST BELOW THE  
LOWER EDGE OF THE  
ZONE OF UNCERTAINTY  
BETWEEN .04 & .05 LB.
4. ADD A TEST LOAD  
EQUAL TO 1.4  $d$  TO  
THE SCALE. (.014 LB.)
5. THE INDICATION  
SHOULD READ A  
STEADY .06 LB.
6. IF THE SCALE PASSES  
THIS TEST AT A LOAD  
NEAR ZERO, THE TEST  
SHOULD BE PERFORMED  
NEAR THE MAXIMUM  
TEST LOAD.
7. SEE PART B OF THIS TEST  
FOR FURTHER INFORMATION.

THE PRINCIPLES USED IN THIS  
EXAMPLE CAN ALSO BE USED TO  
TEST SCALES WITH MINIMUM  
DIVISIONS GREATER THAN .01 LB.



# DIGITAL ZERO TESTS

APRIL 5, 1988



THIS EXAMPLE IS BASED ON A SCALE DIVISION OF .01 LB.

## TEST NOTES

Auto Zero Indication  
 1) Zero scale .00  
 Apply .007 +.01  
 2) Zero scale .00  
 Apply .007 +.01  
 Zero scale .00  
 Remove .007 -.01 or  
 a below zero indication. If  
 scale passes go to the next  
 test.

Width of Zero Indication  
 1) Zero scale .00  
 Apply .007 +.01  
 Zero scale .00  
 Remove .007 -.01 or  
 a below zero indication.  
 Apply .014 +.01 Stable

Apply or remove weights all at once in both tests. Use forceps if necessary.

THE PRINCIPLES USED IN THIS EXAMPLE CAN ALSO BE USED TO TEST SCALES WITH MINIMUM DIVISIONS GREATER THAN .01 LB.

B = BREAKPOINT





## APPENDIX F



UNITED STATES DEPARTMENT OF COMMERCE  
National Bureau of Standards  
Gaithersburg, Maryland 20899

December 31, 1987

MEMORANDUM FOR State Weights and Measures Directors

From: Albert D. Tholen, Chief  
Office of Weights and Measures

Subject: Office of Weights and Measures Training 1988

In order for weights and measures agencies to plan ahead in their budget and travel requests, and for the Office of Weights and Measures to receive recommendations and feedback on training needs, OWM is publicizing its preliminary training plans for the coming year.

The NBS in its authorizing legislation has the responsibility of "securing uniformity of weights and measures laws, regulations, and methods of test..." One of the chief mechanisms for developing uniformity is in the delivery of training to state and local weights and measures officials.

Training in laboratory metrology is provided to state metrologists in two-week introductory seminars and one-week intermediate courses. The regional measurement assurance groups also provide review of metrological procedures that serves as training. OWM's plans for training in the coming year in the laboratory area are shown on the attached calendar.

In the area of general weights and measures enforcement, OWM has focussed considerable resources over the last several years in the development of training materials in the form of NCWM training modules. Since the advent of the National Training Program Modules, the Office has concentrated its delivery of training on the modules. During FY 1987, for example, Dick Smith has been providing extensive training on Module 8, Retail Motor Fuel Dispensers and Consoles. Training has also been provided on other modules and areas on an as-requested basis, including Modules 1, 2, 4, 5, 10, 20, 21, and 27.

For increased efficiency, effectiveness, and uniformity, OWM has made several improvements in its delivery of training to the states in the past several years. The first has been to form "tri-state" regions so that OWM can deliver training to multiple jurisdictions in close proximity to one another at one time, and so that these jurisdictions can, in turn, learn from each other, details of administration or enforcement that their near neighbors use.

The attached calendar indicates our plans for tri-state training in the coming year. We will concentrate on Module 4, Medium Capacity Scales, because it is a soon-to-be published module with which very few inspectors are familiar. We will also emphasize Module 2, Electronic Retail Computing Scales, because of the importance of these devices to the average inspector's workload, and because of the importance of this module in conveying many of the subtleties of the new Scales Code.

We have directed our attention to developing trainers in the modules in tri-state groups wherever possible. Of course, the first step in developing trainers is to deliver and explain the technical content of the modules to the potential trainers themselves. This is why we have called many of the module training sessions for the tri-state groups "Train-the-Trainer" workshops.

It is necessary to develop more trainers for more modules than presently exist. Even with tri-state training arrangements, 17 sessions are required to deliver just one module to the entire country (50 states/3). In order to alleviate the pressing need for more trainers, we are announcing a new regional approach to our "Train-the-Trainer" workshops organized around the weights and measures association regions.

In order to provide lead time for states (or regional associations) to plan for the necessary travel, we plan to begin to deliver modules to the four weights and measures regions as a whole beginning in 1988.

We will concentrate on two types of modules: (a) Those modules that are absolutely essential for understanding by every weights and measures official in the Nation; and (b) those modules in "specialty" areas.

Module 2, Electronic Retail Computing Scales, is an example of the first type of module. The weights and measures community is in dire need for more trainers in these modules. We will hold a train-the-trainer workshop in this type of module with a maximum attendance of 15 to 20 participants, such that each state from a region can send one trainer on the particular module being offered. We plan to provide in-depth training in instructional techniques as well as the technical material covered in the module. For example, the use of visuals, hands-on training techniques and the use of field trips will be covered.

Module 5, Vehicle and Axle-Load Scales, is an example of the second type of module. There are few inspectors in each state whose job it is to check such devices. Therefore, it is difficult for individual states to collect enough students even in tri-state groups to present the module. OWM has traditionally provided training in specialty areas on an as-needed basis even when there were no modules available or planned (e.g. taximeters and odometers). OWM will deliver training in specialty areas such as Module 5, Module 20, Vehicle-Tank Meters, and Module 21, LPG Liquid-Measuring Devices on a regional basis beginning in August of 1988. This training is not train-the-trainer; it is intended for the specialists in the states who must do the testing.

See the attached preliminary schedule for 1988 regional training.

We, in OWM, want to work with each of you to provide sources for the best training to your staff of which weights and measures is capable. The first step in the process is to inform you of our staff's delivery plans in the coming year. We will, of course, discuss with each of you these preliminary plans before finalizing them, but we would sincerely appreciate your reactions to the overall plan and specific delivery schedule by letter or by phone. We have put the attached calendar on the WAMIS Bulletin Board. If you are planning training in the coming year and would like to publicize it, please let us know and we can put your information onto the WAMIS calendar.



## TRAINING CALENDAR 1988

### Laboratory Metrology

Mar 7-18	PK	Basic Metrology Seminar	Gaithersburg, MD
Apr 11-15	PK	Intermediate Metrology Seminar	Gaithersburg, MD
Sept 26-30	PK	NEMAP	Trenton, NJ
Aug 1-5	PK	MIDMAP	Minneapolis, MN
Oct 17-21	PK	SWAP	Little Rock, AR
Apr 3-7, 1989	PK	SEMAP	Huntersville, NC

### Tri-State Training Seminars

Feb 1-5	RNS	AZ, UT, NV	Module 2	Phoenix, AZ
Feb 15-19	RNS	MT, WY, ND, SD	Module 4	Billings MT
Mar 14-18	RNS	AL, MS, GA, FL, TN	Module 4	Atlanta, GA
Mar 21-25	RNS	WA, OR, ID, AK	Module 4, (Module 2 alternatively)	Moscow, ID
Mar 28-Apr 1	RNS	KS, MO, NE, IA	Module 4	Kansas City, KS
May 23-27	CSB	KS, MO, NE, IA	Module 10	Kansas City, KS
Jun 6-10	RNS	NC, SC	Module 8	Columbia, SC
Aug 1-5	RNS	NY State & Local	Module 4	Morrisville, NY
Sep 5-9	RNS	ME, NH, VT	Module 4	Concord NH
Sep 26-30	RNS/CSB	IN, IL, KY	Module 10	Lexington KY

Regional Training Seminars

Apr 11-15	SH	Western	Taximeter/Odometer Specialists
Jun 6-10	CSB	Western	Module 21      Boise, ID (Specialists)
Aug 15-19	RNS	Central	Module 5      Gaithersburg, MD (Specialists) This seminar with MD W&M
Nov 28-Dec 2	RNS	Northeastern	Module 2      PA Train-the-Trainer

# REPORT OF THE COMMITTEE ON LIAISON

Peggy H. Adams, Chairman  
Chief Sealer, Bucks County  
Pennsylvania Department of Consumer Protection

## REFERENCE KEY NO.

### 500 INTRODUCTION

This is the Final Report of the Committee on Liaison for the 73rd Annual Meeting of the National Conference on Weights and Measures. This report is based on the Interim Report (in NCWM Publication 16), and the Addendum Sheets issued at the meeting.

Reference Key Number, Item Title, and Page Number are identified in Table A. Voting items are identified in **boldface print**, as well as by the suffix "V." Information items are identified by the suffix "I." Withdrawn items are identified by the suffix "W."

(This report was adopted in its entirety by a hand vote of the membership.)

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**Table A**  
**REFERENCE KEY ITEMS AND INDEX**

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501-3	I	Milk Meters	364
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501-8	I	Oysters by Net Drained Weight	367
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510	I	WEIGHTS AND MEASURES LEGAL CASES	373
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512	I	ADOPTION AND USE OF NCWM PUBLICATIONS	373
513	I	BARK MULCH INDUSTRY COORDINATION	374
514	I	LIAISON WITH OTHER NCWM ORGANIZATIONS INCLUDING THE RETIREE GROUP AND THE ASSOCIATE MEMBERSHIP	375

**DETAILS OF ALL ITEMS**  
(In order of Reference Key No.)

**501-1            I            FEDERAL GRAIN INSPECTION SERVICE**

Mr. Richard R. Pforr, Chief, Equipment Branch, Field Management Division, Federal Grain Inspection Service (FGIS), U.S. Department of Agriculture, reported the following activities for 1987.

1.     During the year, 14 master railroad track scales were tested by FGIS and approved by the Weights and Measures jurisdictions in which they are located. The Los Angeles County master scale is still out of service due to the prohibitive cost of repair.
2.     Seventy scale tests were conducted on thirty-seven railroad track scales used for the official weighing of grain. Seventeen railroad-owned track scales and six scales owned by industry were also tested while on FGIS approved itineraries.
3.     The FGIS facility in Clearing, Illinois is now offering tolerance testing services on large mass test weights to any interested parties. The device used was successfully field tested and has been NTEP evaluated. FGIS recommends that laboratories purchase the device in order to be able to tolerance test, on site, large block weights in grain elevators.
4.     In the May 17, 1988 Federal Register, FGIS proposed to incorporate by reference the applicable requirements of NBS Handbook 44, 1988 Edition; the 1985 edition is now incorporated by reference. This proposal would change the test weight requirement for non-automatic hopper scales to 10 percent of a scale's capacity.

FGIS has been working with appropriate Conference committees and with NBS toward unifying the technical requirements of NBS Handbook 44 and FGIS requirements for FGIS official grain moisture meters. FGIS intends to continue working with NBS on recommendations for development of a national grain sample collection plan.

One major railroad system has asked that FGIS provide testing services for all railroad track scales on their system. FGIS is reviewing the request.

**501-2            I            AEROSOL NET WEIGHT LABELING**

Mr. Howard Pippin of the Food and Drug Administration (FDA) reported that work on the proposed FDA regulation in response to the NCWM's petition has temporarily ceased due to higher priorities for the work. The NCWM petitioned the FDA for aerosol labeling by net weight. The Committee will ask FDA to act on that petition. The State of Georgia requested an example of the potential problem that labeling both volume and weight on the principal display panel might cause. An example might be "Net Wt 7 oz, Net 10 fl oz". This declaration is potentially highly confusing.



501-3            I            MILK METERS

Mr. James Schnitzler of Tanks, Inc. of Kansas reported that through the Committee's efforts his company and the Milk Market Administrator of Dallas, Texas have a good working relationship. No additional comments were received regarding acceptance of this milk collection system (see Item 501-3 from the Report of the 72nd NCWM, 1987). The Committee feels that the problem brought before the Committee last year has been resolved and has eliminated the item from its work schedule.

501-4            I            CREDIT CARD SURCHARGE

Now that the Cash Discount Act has lapsed, a surcharge ban for credit cards no longer applies at the Federal level. There has been increased activity in the states to change the way gasoline is priced at the gas pump. The Laws and Regulations (L&R) Committee is making a recommendation concerning multi-tier pricing on single-unit-price computing (see Item 232-7 of L&R Committee). Twelve states (California, Colorado, Connecticut, Florida, Kansas, Maine, Massachusetts, Minnesota, New York, Oklahoma, Texas, and Wisconsin) have passed legislation prohibiting or banning a surcharge on a credit card sale. In a related survey conducted by North Carolina, 19 states report that they prohibit a fuel dispenser from being set at the cash price with a higher price charged for the credit card.

The following testimony was presented to the NCWM Laws and Regulations Committee concerning Item 232-7:

Elected officials of twelve states which comprise over one-half of the U.S. population have passed legislation banning surcharges. The Federal Trade Commission and the Federal Reserve Board are not pre-empting the current laws of these states. The National Association of Attorneys General is currently taking a strong stance in protecting the consumer and at this time would support legislation already in place in those states. The NCWM is an organization which promotes uniformity. Changing the guidelines and policy to reflect a method of sale by setting the computer in a liquid measuring device at the lowest price is not uniformity.

The consumer feels he is receiving something when he receives a cash discount; when the higher (credit) price is posted, the consumer should know that he will not pay more than that price. The Consumer Federation of America (CFA) and the Consumer Union have been on record for over a decade with the position that consumers who pay cash should not subsidize credit card sales for gasoline or any other product. CFA does not believe that the cost will be kept down competitively, but that the cost will be shifted to the lower income person who pays cash and cannot afford credit cards.

There will be confusion in the marketplace. Abuse will be just as high or higher on an add-on charge as on a discount. Consumers also have a responsibility. The oil companies should improve the public's education on "discounts for cash" through the media and give all stations bearing their logo, whether company owned or other, signs, letters, etc., to make the discount clear at the point of sale.

Weights and Measures Officials should enforce the "discount for cash" and also educate the consumer. The Committee has concerns about the effect of this change on the marketplace as a precedent. The Committee applauds those oil companies that competitively charge the same price for cash or credit. CFA and Consumers Against Penalty Surcharges (CAPS) have monitored the marketplace and have received no input from consumer agencies or organizations that there is a problem.

The Committee requests that the Laws and Regulations Committee hold over the agenda item and receive further documentation on abuse of cash discounting procedures. The Liaison Committee proposes to communicate with the 12 states, the Federal Reserve Board, and the Federal Trade Commission in an effort to create uniformity and prevent the violation of any laws.

#### 501-5 I FEDERAL ROLE IN NET CONTENT COMPLIANCE

The U.S. Department of Agriculture (USDA) plans to publish a net weight proposal after the National Conference Annual Meeting in July 1988. FDA will join in the proposal, putting into regulation form the agreement reached with the NCWM and voted on in Item 103-2 in the Executive Committee Report and in Item 240-1B in the L&R Committee Report. However, this proposal will be published only if the recommendations of the Task Force on Commodity Requirements are approved by the Conference. USDA's regulation will state that USDA will adopt the test methods contained in Handbook 133 and the MAV's therein. State and local weights and measures jurisdictions should periodically verify which version of Handbook 133 USDA has currently adopted. These procedures will be used by the in-plant Federal inspector.

The U.S. Borax Company reported that there are no problems at this time regarding the use and acceptance by jurisdictions of the alternative volumetric compliance testing procedure. They stated a willingness to continue working with any jurisdiction desiring help. The Committee considers this issue completed.

#### 501-6 I INTERACTION WITH FEDERAL AGENCIES

The Liaison Committee reviewed its procedures for maintaining an ongoing Conference relationship with appropriate Federal agencies. Representatives from Federal Agencies were invited to meet with the Committee and discuss their programs pertaining to net weight labeling and other responsibilities of concern to state and local weights and measures officials.

Mr. Theodore H. Yaffee, Principal Program Engineer of the Engineering Support Center of the United States Postal Service (USPS) met with the Committee. He stated that the USPS would like to work more closely with the Conference. There are seventy divisions within the Postal Service and each division maintains scales. He provided their current maintenance bulletin, which states that testing procedures for mechanical scales are in agreement with Handbook 44.

Last year the Committee responded to a Federal Register announcement for comments to the Bureau of Alcohol, Tobacco and Firearms (BATF) regulations concerning the labeling of non-alcoholic malt beverages. Under BATF requirements, packages of nonalcoholic malt beverages are not required to show the quantity declaration parallel to the base or in the lower 30 percent of the principal display panel. The NCWM letter requested that BATF (1) recognize that state requirements also cover nonalcoholic malt beverages and (2) require that these declarations be placed in accordance with the Uniform Packaging and Labeling Regulation. BATF replied that they will consider our request at a later date. The Committee will again request consideration of its proposal.

The State of Virginia has requested assistance from the Committee in working with the Department of Defense. Virginia checks military commissaries located in their state. A report is sent to the commissary concerned and to the Department of Defense coordinator for commissaries. Virginia has not been receiving any feedback from these inspections. The Liaison Committee will work with the

Department of Defense and Virginia to resolve the problem. In an effort to improve cooperation, the Committee will send the test reports and communications to the Directorate of Commissary Operations, U.S. Army Troop Support Agency, which is the department in charge of the Commissaries.

The Federal Trade Commission's Divisions of Advertising Practice, Marketing Practice, Enforcement, Credit Practice, and Service Industry Practice are interested in weights and measures activities. Their names, addresses and telephone numbers are available on the NCWM "WAMIS" bulletin board.

An effort will be made by the Committee to re-establish liaison with the U.S. Office of Consumer Affairs. This will be particularly important when the Task Force on Commodity Requirements releases the final report on moisture loss in poultry, red meat and flour products.

501-7                      V                      LABELING OF TURKEY WITH GRAVY

(This item was adopted.)

A presentation prepared by Mrs. Kristie Anderson, City Sealer, Everett, Washington, was given to the Liaison Committee. California and Maryland have also reported problems with frozen turkey with gravy packets. The issue is twofold. First, there is the question of mislabeling. The City of Everett and the State of Washington maintain that the products do not clearly inform the consumer that the package contains both turkey and gravy. Second, Federal regulations permit the company to declare either net weight for the entire product, turkey plus the gravy packet, or to declare net weight for the turkey and gravy separately. The presentation indicated that the consumer would like to know how much gravy and how much turkey is being purchased. The net weight statement frequently is not easy to find. In some cases, the weight is on the principal display panel, but in small, hard-to-read type. In other cases, the weights are on a tag tied to the top of the turkey bag, sometimes with the gravy weight covered over by another label applied by the retail store.

The USDA agreed in the past that the size of the type and the location of the "with gravy" statement was not correct. To correct the problem, USDA issued Policy Memo 99 in September 1986, that established requirements for the "with gravy" statement. If weights and measures officials find labels that are not in compliance with this policy memo, USDA will review the label and will require changes to bring the label into compliance.

The resolution of this net weight declaration issue will require a change in USDA's regulations.

Based on the evidence presented to the Liaison Committee, the Committee feels that there is a problem, and that the consuming public will be well served if the USDA regulations are changed to require that the gravy or sauce portion of this combination package be net weight labeled. Because the use of convenience foods is growing, it is recommended that the NCWM petition USDA to consider applying the same net weight labeling requirements to all poultry and meat products, not just turkey products.

The Committee proposes that the Conference petition the USDA to require that poultry and meat products containing gravy or sauce packets be labeled with both total net weight for the entire product and the net weight of the gravy or sauce packets.

## 501-8 I OYSTERS BY NET DRAINED WEIGHT

The Liaison Committee and the Laws and Regulations Committee met jointly to consider problems with the net contents of oysters out of the shell. North Carolina has had compliance problems with oysters; it appears that a large number of oyster packages fail the requirement that a package of oysters contains not more than 15 percent by weight of free liquid. This was the single most reported complaint from the restaurant trade in North Carolina last year. FDA now requires that oysters out of the shell be labeled by fluid volume only. The Liaison Committee will contact FDA to determine the conditions for FDA to permit oysters to be labeled by net drained weight.

## 501-9 I METRIC LABELING/FDA COMPLIANCE POLICY GUIDE

The Industry Committee on Packaging and Labeling (ICPL) requested the Liaison and L&R Committees to consider two aspects of the Food and Drug Administration's (FDA) Compliance Policy Guide 7150.17, "Metric Declarations of Quantity of Contents on Product Labels."

The first issue regards minimum type size requirements when the term for milliliter (mL) is used. The requirement of the small "m" and capital "L" raises questions of the minimum required type size and what the free space surrounding the net quantity statement should be when the small "m", which is required by the guideline, is the only lower case letter in the entire net quantity statement.

Resolution of this issue has been discussed with representatives of the Department of Commerce, FDA, Federal Trade Commission (FTC) and by the Food and Grocery Products Committee of the American National Metric Council. A petition is being sent to FDA and FTC by the American National Metric Council requesting that the small "m" in mL be one-half (1/2) the size of the minimum type required. The Industry Committee has requested the NCWM to concur with this petition.

The second issue regards rounding. The FDA guide specifies rounding up when the digit to be dropped is 5 or higher, and down when it is 4 or lower. This is contrary to current industry practice and NCWM recommendations (see Item 231-2 of the L&R Committee for specifics). The Industry Committee desires to have a resolved and uniform method agreed to by all parties. The Liaison Committee will ask FDA to consider changing its policy guideline regarding rounding to be consistent with NCWM's, which recommends dropping the last digit rather than rounding up. This change in policy will promote uniformity in metric labeling.

## 502 I PUBLIC LIAISON

The Committee heard from members of several organizations that interact with the Conference and with weights and measures officials:

The National Bark and Soil Association represents manufacturers of bark, peat, humus, manure, and soil items for nursery and consumer use. It requested the Committee to assist in improving uniformity in packaging for the industry and inspections by weights and measures officials. (See Item 513.)

The United States Metric Association (USMA) requested NCWM assistance in supporting use of the metric system. USMA and the American Metric Council work with the Office of Metric Programs in the U.S. Department of Commerce. (See Item 501-9.)

Representatives of two associations informed the Committee of their activities and requested closer liaison with the NCWM.



The Association of Food and Drug Officials (AFDO) is closely aligned with FDA, USDA and various government and private agencies that are interested in model food safety laws and regulations.

The National Industrial Scale Association (NISA) was recently formed from the railroad group of the former National Scalesmen's Association. Their members are users and manufacturers of heavy duty scales, including railroads, utilities, grain shippers, and hopper scale owners. The Association meets in May and October each year. They publish a newsletter.

The Committee has also had comments and information from the following organizations concerning items on the 73rd Conference agenda. These groups include: The National Association of Consumer Agency Administrators (NACAA); Consumer Federation of America (CFA); Consumers against Penalty Surcharges (CAPS); and The Attorney General's Office of California.

The Committee will continue to provide liaison with these organizations.

The Committee will send requests for comments and information concerning several agenda issues to the National Association of Attorneys General, National Association of District Attorneys, National Association of Consumer Agency Administrators, Consumer Federation of America, Scale Manufacturers' Association and the International Society of Weighing and Measurement.

The Committee will continue to advise the Executive Secretary to send information to appropriate organizations concerning Conference meetings and issues.

## 503 I OIML ACTIVITIES

Dr. Sam Chappell, Chief, National Bureau of Standards Office of Standards Management, and the U.S. Representative to OIML, presented an update of OIML Activities. His presentation covered current action items, upcoming meetings of interest, and policy issues.

### OIML PS5D/RS10 "Direct Mass Flow Measurement of Quantities of Liquids." (USA)

At the last meeting of CIML in Paris in September 1987, the U.S.A. was assigned the responsibility for establishing this reporting Secretariat. On December 12, 1987 a meeting was called to establish a USNWG for this work. Twelve persons attended. A work program was defined that included preparing a first predraft International Recommendation on the instrument. The draft IR was distributed to the USNWG in March 1988 and subsequently discussed at a meeting held in May. It is expected to be distributed to the International Working Group (IWG) in August 1988 and an IWG meeting is anticipated in the Spring of 1989. So far, 27 OIML Member Nations have indicated commitment to collaborate in the work (15 as participants and 12 as observers).

### PS7 on "Weighing Instruments" (USA)

#### o PS7/RS2 On "Electronics" (USA)

The NCWM has participated over the past several years in the development of IR74 on "Electronic Weighing Instruments" which was approved by the IWG in Copenhagen in April 1986 and subsequently by CIML. A subject covered in the draft on "durability tests" was unresolved. After requesting views of collaborating member nations, the USNWG at its October 1987 meeting decided not to reference such tests in this IR that will be submitted to the 1988 OIML Conference. However, such tests would be referred to in an Annex of the IR to indicate that such tests were intended but could not be included at this time. This reporting Secretariat met with PS2/RS6, which has responsibility for DI 11 on "General Requirements for Electronic Measuring Instruments," in Copenhagen from May 16-20, 1988.



Proposed changes by the USNWG for IR74 were agreed upon at that time. Further details of this meeting are given in the NCWM S & T report.

o PS7/RS5 on "Automatic Weighing Instruments" (U.K.)

The following drafts were distributed for review and comment:

- 1st predraft revision of IR 50 on "Continuous Totalizing Automatic Weighing Instruments (Beltweighers)"
- 4th predraft IR on "Discontinuous Totalizing Automatic Weighing Instruments"
- 4th predraft IR on "Automatic Rail-Weighbridges"

This Secretariat met in Teddington, England from April 18-22, 1988 to discuss this work. The U.S. delegation included four representatives of manufacturers and one for the NCWM. A meeting of the U.S. National Working Group was called in March to establish a U.S. position on these draft IRs after which comments were sent to the U.K.

o PS7/RS4 Non-Automatic Weighing Instruments (West German and France)

The major activity of this Secretariat has involved combining OIML IRs 3, 88, and 74, on metrological requirements, technical requirements, and electronics for non-automatic weighing instruments, respectively. Several meetings of the IWG have been held, most recently in Braunschweig West Germany in June 1987. A companion activity has been the work of the Nordic Task Group in developing test procedures and test report forms for inclusion in this IR. At the June meeting of the IWG of the PS7/RS4 and PS7, the combined IR was provisionally accepted, including the test procedures and report forms. Four unresolved issues were circulated to collaborators for consideration and vote by correspondence. This IR was distributed for vote at the CIML level to the USNWG for review. We believe that U.S. interests are not completely satisfied with this IR, but that it would have been in our best interests to vote YES. However, since durability tests were included, we voted NO. It appears that France, FRG, and UK want to include these tests. Because of the unresolved issues, we expect work to continue on these instruments after the 1988 OIML Conference.

o PS7/RS8 on "Load Cells" (USA)

In January 1987 the USNWG sent a questionnaire to the IWG concerning changes in IR 60 on "Metrological Regulations for Load Cells." A good response was received. The USNWG met here on January 11, 1988 to review the results. A meeting of the IWG was held April 13-15, 1988 in Teddington, U.K. to discuss proposed changes in IR 60. The IWG agreed to several revisions that have been incorporated in a revised IR60.

International Intercomparison of Load Cells

Australia, The Netherlands, West Germany, U.K., and U.S.A. participated in an international intercomparison of 6 load cells, two of which were provided by U.S. manufacturers. The measurements have been completed by the 5 laboratories. The data are to be analyzed by NBS; however, not all test results have been received. Available results were reviewed on April 11-12, 1988 in Teddington, England. An objective of the intercomparison is to achieve an agreement for mutual acceptance of test data on load cells by the participating nations.

PS20 on "Packaged Products" (USA)

Two recommendations have been developed as follows: (1) a draft IR on "Information on Package Labels" (PS20/RS1, U.S.A.) that is fully compatible with the NCWM recommendations on packaging and labeling regulations and (2) a draft IR on "Verification of the Net Content of Packages" (PS20/RS2, Switzerland). Both IRs were approved by CIML and are expected to be sanctioned at the 1988 OIML Conference. The efforts of NCWM in these activities, especially by the Industry Committee on Packaging and Labeling, have been very effective and very much appreciated.

Other Meetings of Interest

- o The Presidential Council for CIML, the policy committee for the organization, met at BIML in Paris from January 20-22, 1988. I attended. The principal items of the agenda included: establishing priorities for the work of the Secretariats, long-range plans for 1989-92, and a proposed OIML certification system.
- o A Seminar on Training of Metrologists was held in Havana, Cuba in April 1988, sponsored by the OIML Development Council.
- o The International Conference of Legal Metrology will be held in Sydney, Australia October 24-28, 1988. Twenty-six IRs developed since the last Conference are expected to be sanctioned. Several were prepared or significantly influenced by the U.S.A. Dr. Stanley Warsaw will lead the U.S. Delegation. John Bartfai, next chairman of NCWM; Al Tholen, OWM; a State Department Representative and I, as U.S. Representative to OIML, also plan to attend. Others have been invited.

Dr. Chappell appreciates the strong support of NCWM as emphasized by its new policy statement and would like the NCWM to consider a means of recognizing equivalence of the S & T specifications in Handbook 44 with relevant OIML recommendations. Proposals on this issue will be presented in the near future.

504                    I                    OWM STATUS REPORT

Mr. Albert Tholen, Chief, Office of Weights and Measures (OWM), reported on the status of the OWM in terms of staffing and program changes. See Item 102-7 and Appendices of the Executive Committee report.

505                    I                    RAILROAD FREIGHT CAR STENCILED TARE WEIGHTS

Mr. John J. Robinson, Senior Assistant Vice President, Association of American Railroads (AAR), reported the following to the Committee.

1. As a result of the continued low business level in the country's major "smokestack" industries that traditionally generate a substantial portion of the railroad's business, many freight cars remain out of service awaiting repairs or on hand as surplus. Most of these cars have not been needed for an extended period of time and have been stored. It would be impractical to incur the switching/movement expense necessary to weigh and restencil them with no immediate prospect for use in revenue service.
2. A total of 77,512 non-exempt cars, or about 10.1 percent of the serviceable fleet of general service freight cars, were restenciled in 1987.

3. There were 56,477 so-called "exempt" cars (i.e., not subject to the basic 60-month reweighing rule) reweighed in 1987. This is about 6.6 percent of the serviceable specially equipped freight car fleet, including 15,303 covered hoppers in 1987.
4. The AAR's technical committees continue to investigate alternative procedures for streamlining the weighing/restenciling process. More and more, tare weights in the AAR computerized equipment register file (UMLER) are used and the cars are not restenciled each time a tare is determined.
5. It should be stressed that the trend in the railroad industry is away from freight rates per hundred weight. More and more freight rates are quoted per car or are based on weight agreements to avoid the time and expense of weighing freight cars.
6. Due to wear on their inside slopes, hopper cars will generally lose weight, and the railroads lose money due to hauling extra material. If stenciled tare weights are used, shippers supply merchandise that is not paid for, while the buyers gain. Based on experience, the stenciled weight may be as much 300 pounds in error on a 100,000-pound car.

The Committee heard from industries which determine tare weights each time cars are unloaded. The Committee urges closer cooperation between industry and AAR to update tare weights in UMLER.

506            I            THE 150TH ANNIVERSARY OF THE STATE  
STANDARDS PROGRAM

The Committee has presented several suggestions to the Executive Committee that focus on the 150th anniversary of the first delivery of mass standards to the states in 1838. This first move towards national uniformity in weights and measures standards was the result of a Joint Resolution of Congress in 1836 that directed the Secretary of the Treasury to furnish and deliver a set of balances to each Governor.

The Executive Committee has prepared a special commemorative parchment of the 1836 resolution that was presented to all members attending the 73rd Conference in Grand Rapids and will be mailed to all other members. The Chairman's welcome reception and the opening ceremony featured the anniversary theme. The Associate Industry Committee assisted in getting the napkins with the NCWM Seal and the anniversary theme.

The State of Michigan assisted the Executive Committee in planning various media programs to feature the anniversary at the time of the NCWM Annual Meeting.

The Public Information Office of the National Bureau of Standards has recorded a public service radio tape of remarks by the Conference Chairman; it will be sent to the 500 radio stations that regularly receive U.S. Department of Commerce public service announcements.

Some suggestions were made concerning advertising specialties. The pens with the NCWM Seal and the 150th anniversary were given to each conference attendee.

507            I            LIAISON WITH REGIONAL ASSOCIATIONS

Mr. Richard Smith, Regional Association Coordinator, OWM, presented a report on activities of each regional organization. He reported that the regionals now deal more with national issues, and

that more industry representatives attend the regional meetings. This has had a positive influence on how the regional organizations have reacted to issues. It was suggested that NBS have the NBS staff person for one of the standing committees also attend the regional meetings if that region is to discuss an issue before the standing committee. This will be done contingent on available funding. Richard Smith did not attend all interim regional meetings this year because travel funds were not available.

The meeting times for the regional meetings in relation to the NCWM Annual Meeting was discussed. Two regional meetings are held in the six-month period before the NCWM Annual Meeting and two regional meetings are held in the six-month period before the NCWM Interim Meetings. This time table should be maintained.

The Committee provided a demonstration and discussion of the NCWM "WAMIS" electronic bulletin board at the Annual Meeting. Further discussion will continue toward providing information on computers and programs for those groups interested in forming user groups for specific areas of interest.

The need for an information users group (computer users) at the regional level was discussed. Richard Smith was asked for his help in identifying a person in each region to be a focal point for providing information to the WAMIS Computer Bulletin Board. It was suggested that the Education Committee might be a focal point for the ongoing coordination of this project. Mr. Smith indicated that he would discuss the issue with the regionals and see if he could get a coordinator appointed in each region. Members who want to access WAMIS by computer modem should contact Mr. Karl Newell of the NBS Office of Weights and Measures.

#### 508 I PROMOTION OF NATIONAL TRAINING PROGRAM (NTP)

The Committee reaffirmed its support of the National Training Program (NTP) for use by industry and Federal agencies in addition to state and local weights and measures officials. A letter will be sent to the Associate Membership urging training module use as an industry training device. The Committee also recommends that:

1. the Conference promote module use by way of endorsements (testimonials) from State and local weights and measures officials who have successfully used the modules;
2. articles supporting use be placed in regional association newsletters; and
3. updates and revisions to modules already in distribution be placed on the WAMIS Bulletin Board.

#### 509 I WEIGHTS AND MEASURES WEEK

The Weights and Measures Week Guide, NCWM Publication 7 is being rewritten not only as a weights and measures guide, but also as a general public relations publication with year-round suggestions. State Directors and Weights and Measures Week Coordinators will receive copies of the new publication when it is printed. Members may write to OWM for a copy. Each year, the coordinators will be mailed updated information as supplements to the Guide.

The theme for 1988 was "State Standards Program: 150 Years." It commemorated the 1838 amendment to the Joint Resolution of Congress in 1836, which directed the Secretary of the Treasury to furnish and deliver one set of all the weights and measures adopted as standards, and later, one set of balances to each Governor.



An effort was made to contact every state, county and city director or chief sealer with a letter and packet for Weights and Measures Week.

The video cassette, "Equity in the Marketplace," will be lent to any weights and measures jurisdiction. It can be copied at that time and returned or \$10.00 can be sent (to cover the cost of a cassette and its mailing) to Mrs. Peggy Adams, Bucks County Consumer Protection Weights and Measures, Broad and Union Streets, Doylestown, PA 18901.

Weights and Measures Week is observed March 1-7 each year. It commemorates the first Federal weights and measures law, which was enacted as the Act of March 2, 1799, and signed by President John Adams.

#### 510 I WEIGHTS AND MEASURES LEGAL CASES

The Committee discussed the different areas that could be covered.

Mr. Chip Kloos of Beatrice Foods will formulate a data base for cases involving package checking. Mr. Jerry Hanson of San Bernardino County, California, will begin a data base for his area's cases and enlarge it for use by the Western Weights and Measures Association.

The Committee recommends that a procedure be written for informational purposes so that weights and measures officials may easily use the cases that pertain to their issues as a resource.

#### 511 I INTERACTION WITH PRIVATE SHIPPERS SUCH AS UPS, FEDERAL EXPRESS, ETC.

The Liaison Committee met jointly with the S&T Committee to discuss the types of scales that are appropriate for use to determine service charges such as shipping and laundry scales. In particular, the Committees addressed the scales to be used in businesses that serve as pick-up points called "Commercial Counters" for private shipping companies. This issue has reached a critical level because of the large number of stores and businesses that now serve as commercial counters.

The Committees appreciate the fact that these businesses provide a useful service to the public, but the scales used to determine the charges for packages are commercial devices. The Committees feel very strongly that it is important that class III or higher accuracy class scales be used in commercial applications. The comments received from weights and measures officials during this joint meeting supported the position of the Committees.

The Committee strongly recommends that the Conference vote approval on Item 320-18 of the S&T Committee Report to clearly indicate the resolve of the weights and measures officials to require that class III or higher accuracy class scales be used for determining shipping and laundry charges.

#### 512 I ADOPTION AND USE OF NCWM PUBLICATIONS

The Committee is exploring ways to develop a survey to compile information regarding how the various states handle the adopted conference documents, such as Handbooks 44, 130, and 133, NTEP, etc. The desire is to determine and publish how the states adopt Conference documents, how long the process normally takes in each state, to what degree they use them, and how they enforce them.



Input for the survey questionnaire, which might be conducted approximately every 5 years, is sought from all NCWM committees, as well as OWM and industry personnel. Due to the time required for this project, a draft survey will be evaluated at the 1989 NCWM Interim Meeting.

## 513 I BARK MULCH INDUSTRY COORDINATION

Mr. Robert LaGasse, Executive Director of the National Bark and Soil Producers Association (NBSPA), representing the producers of horticultural mulches and soil products, addressed the Liaison Committee regarding short-packed bark mulch products in commercial distribution.

Bark mulch is a manufactured product, graded by size and material, packaged in various volumes convenient for consumer use. The current estimated sales volume for horticultural mulches exceeds \$120 million a year, with 80 percent of that volume produced and sold within the 4-month period between March and June each year. Mr. LaGasse stated that NBSPA members produce approximately 40 percent of that volume.

NBSPA voiced concern over short-packed product which causes unfair competition as well as consumer deception. They realize that bark mulch is found in literally thousands of outlets in every state on a seasonal basis, making it very difficult for weights and measures officials with their sometimes limited resources to find the short-packed products. They have requested assistance in the following areas:

1. a change in the test measure container (see Item 240-3C of L&R report), and
2. increased surveillance by weights and measures, especially during the peak season.

Mr. LaGasse stated that NBSPA has considered several action items to help in the problem solution. They are:

1. a telephone hotline,
2. a product certification program developed and implemented by NBSPA, and
3. encouragement of members to report violations to weights and measures officials.

NBSPA is offering its assistance to NCWM to detect and correct non-complying products.

At the Committee's suggestion, NBSPA will provide NCWM with as complete a list as possible of all the manufacturers and their addresses. This list will be forwarded to the state directors so they can inspect the plants in their states. NBSPA will encourage its members to report violators to NBSPA, which will in turn report problems to NCWM.

Any member who would like to contact the Executive Director of NBSPA should write to Mr. Robert LaGasse, National Bark Producers Association, 13542 Union Village Circle, Clifton, VA 22024, or call (703) 830-5367.

514                    I                    **LIAISON WITH OTHER NCWM ORGANIZATIONS INCLUDING  
THE RETIREE GROUP AND THE ASSOCIATE MEMBERSHIP**

The NCWM National Organization of Retired Members Committee was organized at the 72nd Annual Conference. At that time bylaws were proposed. NCWM waives registration and membership fees for any retiree who has been a weights and measures official or industry member for 10 years and who has attended at least one Annual Meeting of the NCWM. The Retiree groups of the Southern and Western Conferences have organized and are meeting. It seems that persons who have retired in the past 4 years are the most interested. The Committee discussed ways that these members might participate, such as assisting in training trainers for the modules or actually teaching the modules. NCWM would be asked to pay their expenses. Any retiree who has not been contacted should contact Mr. Ray Wells, President, Sensitive Measurement, Inc., Box 72, Pemberton, NJ 08068 or (609) 894-2292. Retiree information will be forwarded to the editors of the regional newsletters.

The Associate Membership group was asked to consider promoting Weights and Measures Week through advertisements in newspapers, radio, and television, as well as ads on grocery bags or other products. Industry members agreed to present these ideas to the Associate Membership at the Annual Meeting.

P. Adams, Bucks County, PA, Chairman

J. Akey, Kansas

R. Davis, James River Corp.

P. Engler, Los Angeles County, CA

J. McCutcheon, USDA

K. Newell, NBS, Technical Advisor

**COMMITTEE ON LIAISON**



**ANNUAL COMMITTEE REPORTS**





## REPORT OF THE RESOLUTIONS COMMITTEE

Charles H. Carroll, Chairman  
Assistant Director of Standards  
State of Massachusetts

### REFERENCE KEY

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#### GENERAL

The resolutions committee wishes to express the appreciation of the members of the National Conference on Weights and Measures to those who contributed their time and talents toward the arrangements for, the conduct of, and the success of this 73rd annual meeting. Special votes of thanks are extended:

- (1) to Burton Cardwell, Chief Deputy, Michigan Department of Agriculture, for his gracious welcome, his support of the Michigan Weights and Measures program, and his enthusiastic description of the highlights of Michigans economy; for his kind compliments of the activities and successes of the National Conference and observations of the participation of the state through the service of Ed Heffron and Frank Nagele; and his stated appreciation of the activities of the National Bureau of Standards in its work with the states and the Conference;
- (2) to Ernest Ambler, Director, National Bureau of Standards, for his continued support of the National Conference; his insightful observations regarding the state of the national economy vis-a-vis the competitive position of the United States in the world provided an understanding of the role technology and its application plays in the health of the Country; his tying of the importance of weights and measures at the state level to the overall economic future was especially interesting and motivational;
- (3) to officers and appointed officials of the National Conference on Weights and Measures for their assistance and service toward progress on national issues;
- (4) to committee members for their efforts throughout the past year preparing and presenting their reports, to the subcommittees and task forces for their discerning and appropriate recommendations;
- (5) to governing officials of state and local jurisdictions for their advice, interest, and support of weights and measures administration in the United States;

- (6) to representatives of business and industry for their cooperation and assistance in committee and Conference work, to the associate membership organization for its hosting functions;
- (7) to the staff of the Amway Grand Plaza for their assistance and courtesies, which contributed to the enjoyment and comfort of the delegates in their fine facilities;
- (8) to the National Bureau of Standards and the Office of Weights and Measures for their outstanding assistance in planning and conducting the work and program of the National Conference on Weights and Measures;
- (9) to the Office of Weights and Measures staff: Ann Heffernan Turner and Terry Grimes, for their expert and hospitable operation of the administrative operations of the meeting; and
- (10) to the Michigan Food Division, Department of Agriculture, for their tireless and essential support to the Conference, its committees, and our guests throughout the meeting week.

C. Carroll, Massachusetts, Chairman

O. R. Elliott, Oklahoma

M. Gray, Florida

G. Macdonald, Minnesota

S. Mcfarlane, Washington

S. McGuire, Illinois

S. Meloy, Montana

R. Smith, NBS, Technical Advisor

## REPORT OF THE NOMINATING COMMITTEE

Frank Nagele, Chairman  
State of Michigan

### REFERENCE KEY

800

The Nominating Committee met during the Interim Meeting at the National Bureau of Standards, Gaithersburg, Maryland, and nominated the listed persons to be officers of the Conference. In the selection of nominees from active membership, consideration was given to professional experience, qualification of individuals, Conference attendance and participation, regional representation, and other factors considered to be important.

The slate of nominees was elected unanimously at the Annual Meeting.

CHAIRMAN-ELECT: Fred Gerk, New Mexico

VICE-CHAIRMEN: Carl Conrad, Jr., New Jersey  
Kathleen Thuner, San Diego County, CA  
Barbara DeSalvo, Ohio  
Kenneth Butcher, Maryland

EXECUTIVE COMMITTEE: Thomas Geiler, Town of Barnstable, MA  
Edward Heffron, Michigan  
Don Stagg, Alabama  
(Mr. Stagg would replace Bruce Niebergall for  
the two years remaining in his tenure)

TREASURER: Charles A. Gardner, Jr., Suffolk County, NY

CHAPLAIN: Martin Coile, Georgia

F. Nagele, Michigan, Chairman

P. Adams, Bucks County, PA  
D. Lynch, Kansas City, KS  
G. Mattimoe, Hawaii  
A. Nelson, Connecticut  
K. Simila, Oregon  
R. Thompson, Maryland

NOMINATING COMMITTEE

## REPORT OF THE AUDITING COMMITTEE

Fred Clem  
Department of Weights and Measures  
City of Columbus, Ohio

### REFERENCE KEY

900

The Auditing Committee met on Tuesday afternoon, July 19, 1988, for the purpose of reviewing the financial reports of the Conference Treasurer, Charles A. Gardner, Jr. The Committee finds these records to be in accordance with Conference procedure and correct.

(On motion of Mr. Clem, the Report of the Auditing Committee, Reference Key Item 900, was adopted by the Conference.)

F. Clem, Columbus, OH, Chairman

G. Hanson, San Bernardino, CA

R. Smith, National Bureau of Standards  
Technical Advisor

TREASURER'S REPORT  
FISCAL YEAR 72 (1987-88)  
NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

July 20, 1988

CASH ON HAND - June 30, 1987

\$55,700.27

RECEIPTS

BUDGET	ACCT.		
(30,000)	1.1	Registrations	\$31,305.00
(45,500)	1.2	Memberships	61,402.50
( 3,500)	1.3	Training Modules	7,420.09
( 2,000)	1.4	Interest	3,192.44
( 1,000)	1.5	Promotional	668.50
( 5,000)	1.6	Special Events	3,790.40
( 200)	1.9	Miscellaneous	250.00
(87,200)		TOTAL RECEIPTS	<u>\$108,028.93</u>

TOTAL CASH BALANCE AND RECEIPTS

\$163,729.20

DISBURSEMENTS

BUDGET	ACCT.		
(10,000)	2.0	Annual Meeting	\$ 9,880.27
( 4,000)	3.0	Interim Meeting	2,383.40
(19,400)	4.0	Committee Oper.	19,241.90
(20,500)	5.0	Special Programs	16,059.77
( 8,500)	6.0	Chairman's Expen.	7,972.04
( 5,000)	7.0	Membership Expen.	7,106.28
( 3,500)	8.0	Printing & Pubs.	3,858.93
( 6,500)	9.0	Administration	10,203.22
( 5,000)	10.0	Special Events	6,057.90
( 800)	11.0	Promotions	962.06
( 4,000)	12.0	Training Modules	3,958.12
(87,200)		TOTAL DISBURSEMENTS	<u>\$87,683.89</u>

BALANCE

(Income - Disbursements)

\$76,045.31

Cash on Hand - June 30, 1988

European American Bank, Hauppauge, NY

\$ 55,046.53

Checking Account - Union Trust Co., Gaithersburg, MD

\$ 314.24

Certificate of Deposit

\$ 20,684.54

TOTAL ASSETS

\$76,045.31

BALANCE GRANT ACCOUNT

\$ 11,258.64

Date Submitted: 7/21/88 Charles A. Gardner  
Charles A. Gardner, Treasurer  
 Date Audited: 7/19/88 Frank J. Smith  
Frank J. Smith, Auditing Committee Chairman  
 Staff Advisor



FY 72 (1987-1988)  
NATIONAL CONFERENCE ON WEIGHTS AND MEASURES  
LISTING OF ACCOUNTS

INCOME

1.1	Registration Fees		<u>31,305.00</u>
1.2	Membership Fees		<u>61,402.50</u>
1.3	Training Modules and Field Manuals		<u>7,420.09</u>
1.4	Interest		<u>3,192.44</u>
1.5	Promotional Items		<u>668.50</u>
1.6	Special Events		<u>3,790.40</u>
1.9	Miscellaneous		<u>250.00</u>
			<u>108,028.93</u>

EXPENSES

2.0	Annual Meeting		
2.1	Hotel/Food Service	<u>9,282.05</u>	
2.5	Photos	<u>473.22</u>	
2.9	Miscellaneous	<u>125.00</u>	<u>9,880.27</u>
3.0	Interim Meeting		
3.1	Hotel/Food Service	<u>2,383.40</u>	<u>2,383.40</u>
4.0	Committee Operations		
4.1	Executive	<u>3,690.11</u>	
4.2	Laws and Regulations	<u>5,920.20</u>	
4.3	Specifications and Tolerances	<u>1,639.24</u>	
4.4	Education	<u>1,605.50</u>	
4.5	Liaison	<u>1,058.85</u>	
4.7	Nominating	<u>246.00</u>	
4.8	Marriott	<u>5,082.00</u>	<u>19,241.90</u>
5.0	Special Programs		
5.1	NTEP	<u>7,399.53</u>	
5.2	OIML	<u>1,432.29</u>	
5.3	TF on Commodity Requirements	<u>3,002.12</u>	
5.5	TF on Device Fraud	<u>509.60</u>	
5.6	TF on Motor Fuels	<u>528.48</u>	
5.7	TF on Belt Conveyors	<u>1,191.70</u>	
5.8	TF on Energy Allocations	<u>1,996.05</u>	<u>16,059.77</u>
6.0	Chairman's Expenses		
6.1	Chairman	<u>6,035.62</u>	
6.2	Chairman-Elect	<u>1,877.62</u>	
6.9	Miscellaneous	<u>58.80</u>	<u>7,972.04</u>
7.0	Membership Programs		
7.1	Computer	<u>2,878.03</u>	
7.2	Contract Work	<u>2,330.75</u>	
7.3	Banners	<u>1,897.50</u>	<u>7,106.28</u>
8.0	Printing and Publications		
8.1	Annual Meeting	<u>1,928.71</u>	
8.3	Letterhead	<u>78.58</u>	
8.4	Membership	<u>292.39</u>	
8.5	Committees	<u>288.99</u>	
8.9	Miscellaneous	<u>1,270.26</u>	<u>3,858.93</u>
9.0	Administration		
9.2	Contract Work	<u>9,995.04</u>	
9.3	Mailing	<u>12.50</u>	
9.5	Bank Charges	<u>116.68</u>	
9.9	Miscellaneous	<u>79.00</u>	<u>10,203.22</u>
10.0	Special Events	<u>6,057.90</u>	<u>6,057.90</u>
11.0	Promotional Items	<u>962.06</u>	<u>962.06</u>
12.0	Training Modules	<u>3,958.12</u>	<u>3,958.12</u>
			<u>87,683.89</u>

## REPORT OF STATE METROLOGY WORKSHOPS

Paul H. Krupenie  
National Bureau of Standards

Workshop sessions were held on Tuesday - Thursday, July 19 - 21, 1988, during the National Conference on Weights and Measures (NCWM) in Grand Rapids, MI.

At the first technical session on Tuesday, Paul Krupenie, National Bureau of Standards (NBS), spoke on the concepts of mass, weight, and force and their relationships. He followed this with a presentation on mass, air buoyancy, and apparent mass, demonstrating numerically that the effect of air buoyancy on apparent mass is small compared with the effect on mass.

On Wednesday, Joseph Rothleder, California, presided over a panel of metrologists, whose presentation of issues and topics was based on input from the regional measurement groups. Panel members included:

Joe Rothleder, WRMG, chair  
Ross Andersen, NEMAP  
Steve McGuire, MIDMAP  
L.F. Eason, SEMAP  
Herb Eskew, SWAP

The consensus was that State metrologists, acting through their regional measurement assurance groups, should create the bulk of the agenda for future Metrology Workshops at the NCWM, focusing on issues rather than only technical presentations, since this is the single forum during which active participation can be expected from metrologists from all over the country. The long list of topics selected demonstrated the need to set priorities.

L. F. Eason succinctly summarized the intent of the panel: To concentrate on (a) helping the conference by offering metrologists' views (as a body) to the Executive Committee on selected issues and (b) helping State metrologists with individual or collective needs.

The concluding technical session on Thursday began with Walter Kupper of Mettler Instruments detailing the environmental conditions under which mass measurements (and checking of balances) takes place at their New Jersey facility. Some specifics concerning the use of their ultramicrobalance were addressed, including the caution not to make measurements during periods of high wind outside, because pressure changes take place too rapidly to be detected by laboratory barometers. Richard Davis of the National Bureau of Standards addressed the almost certain reassignment of mass value to the two 1-kg NBS working standards for mass that are used in the calibration of State standards. The impact upon State metrology centered on the mass regime 10 g to 1 kg, where assigned mass values would be reduced by 0.15 parts per million, but metrologists were advised to take no action until NBS provides further details.

The agenda for the Metrology Workshop for the 1989 NCWM is expected to appear in the 1989 Program and Committee Reports of the NCWM.

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